FIG. 1

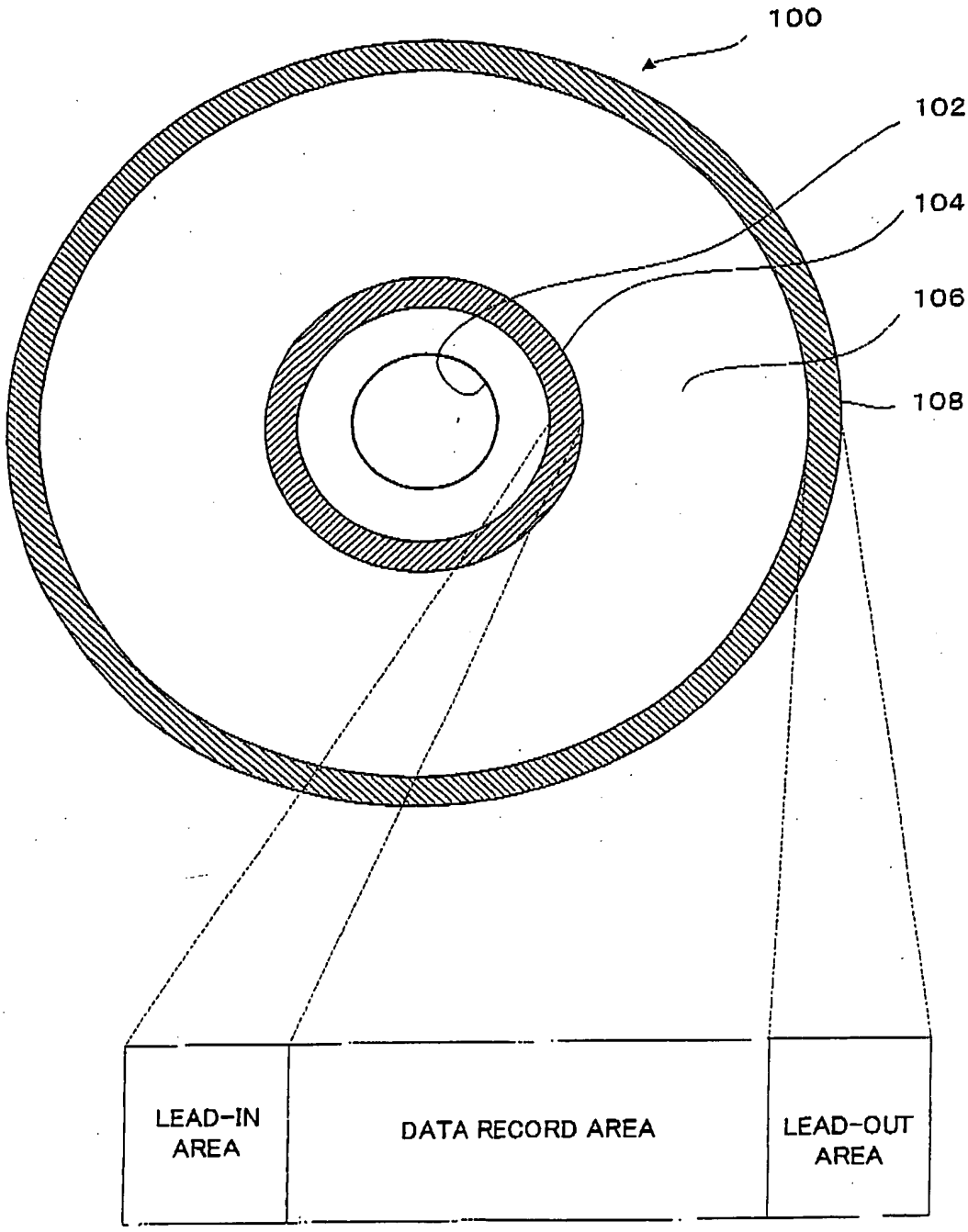

100
102
104
106
108
LEAD-IN AREA
DATA RECORD AREA
LEAD-OUT AREA

FIG. 2

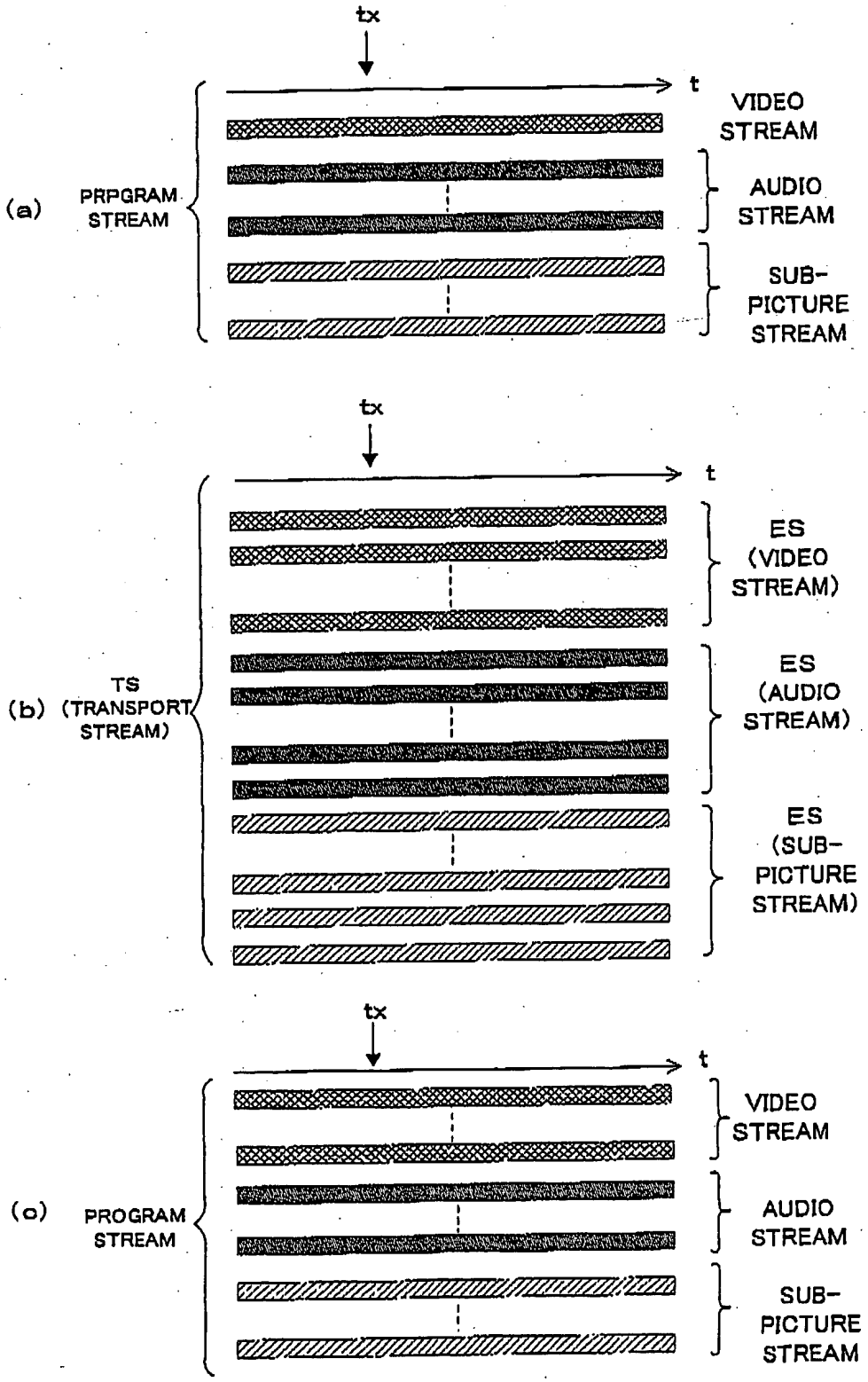

tx
t
(a)
PRPGRAM STREAM
VIDEO STREAM
AUDIO STREAM
SUB-PICTURE STREAM
tx
t
(b)
TS (TRANSPORT STREAM)
ES (VIDEO STREAM)
ES (AUDIO STREAM)
ES (SUB-PICTURE STREAM)
tx
t
(c)
PROGRAM STREAM
VIDEO STREAM
AUDIO STREAM
SUB-PICTURE STREAM

FIG. 3

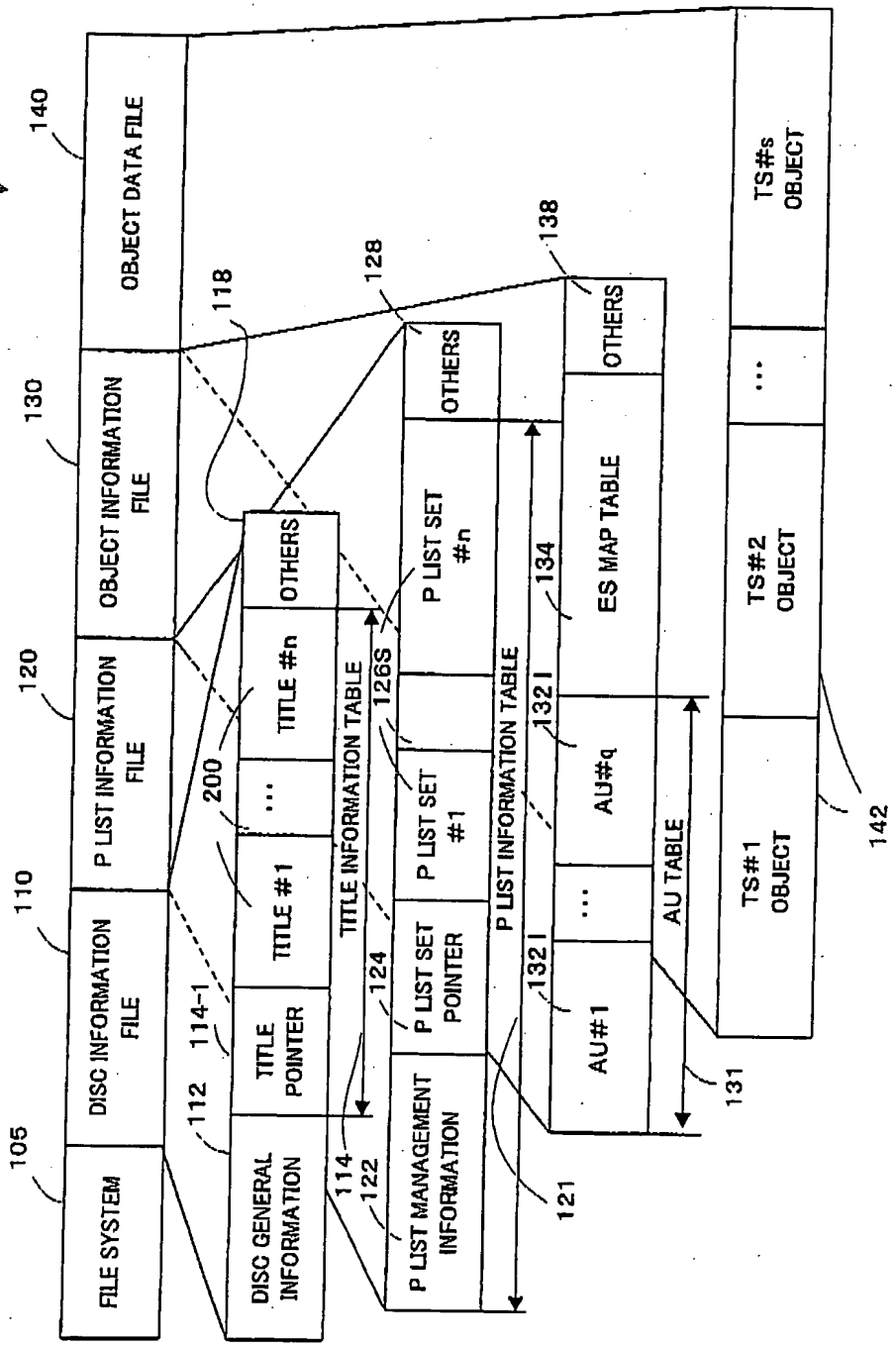

100
140
OBJECT DATA FILE
130
OBJECT INFORMATION FILE
120
P LIST INFORMATION FILE
110
DISC INFORMATION FILE
105
FILE SYSTEM
118
128
138
OTHERS
P LIST SET #n
TITLE #n
...
TITLE #1
TITLE INFORMATION TABLE
126S
200
P LIST SET #1
P LIST SET POINTER
TITLE POINTER
114-1
112
DISC GENERAL INFORMATION
124
114
122
P LIST MANAGEMENT INFORMATION
P LIST INFORMATION TABLE
121
132-1
134
ES MAP TABLE
OTHERS
AU#q
...
AU#1
AU TABLE
131
TS#s OBJECT
...
TS#2 OBJECT
TS#1 OBJECT
142

FIG. 4

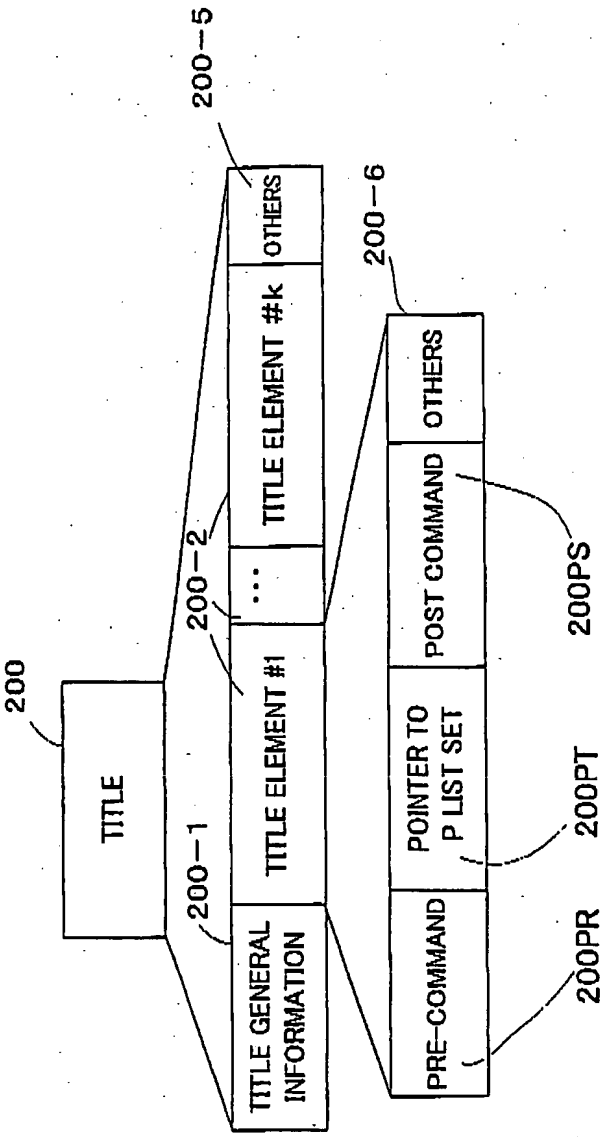

200
TITLE
200-1
TITLE GENERAL INFORMATION
200-2
TITLE ELEMENT #1
...
TITLE ELEMENT #k
200-5
OTHERS
200-6
PRE-COMMAND
POINTER TO P LIST SET
POST COMMAND
OTHERS
200PR
200PT
200PS

FIG. 5

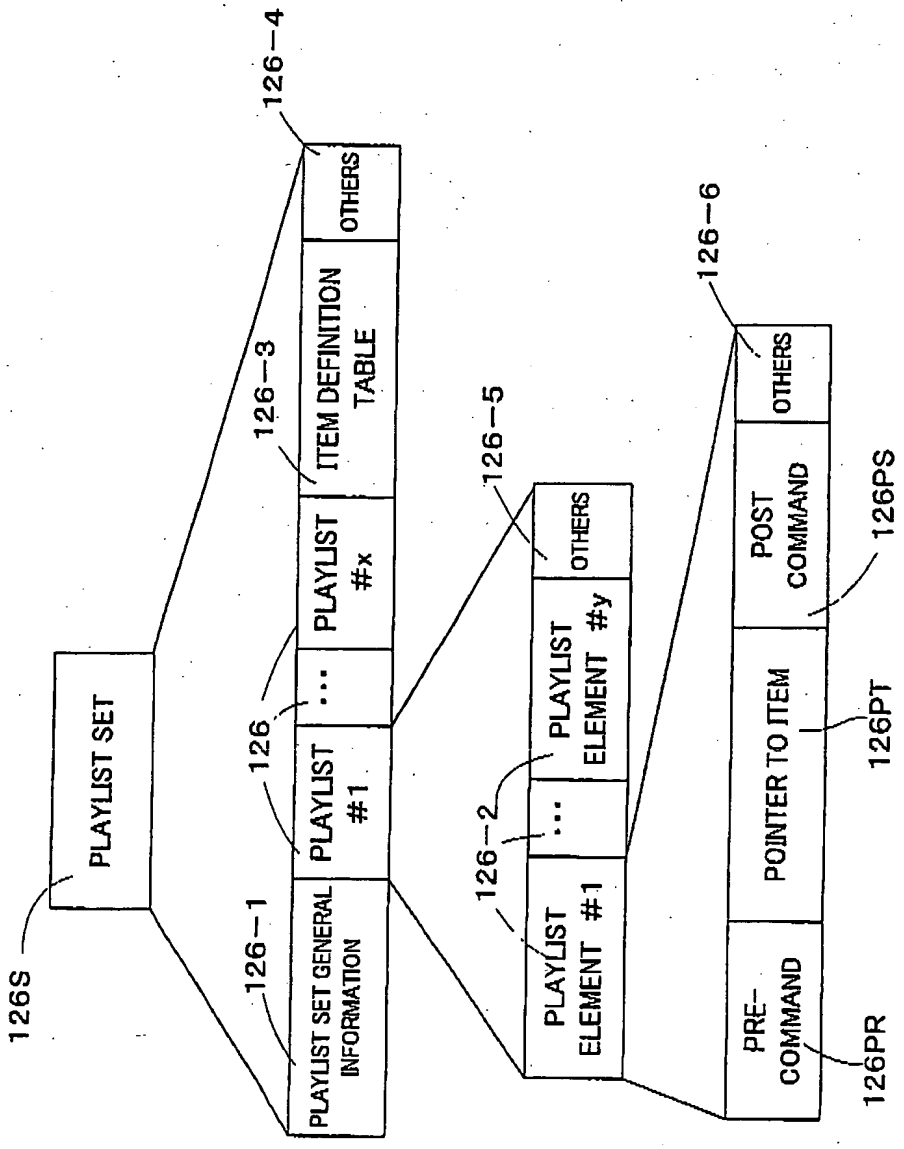

126S
PLAYLIST SET
126-1
PLAYLIST SET GENERAL INFORMATION
126
PLAYLIST #1
...
PLAYLIST #x
126-3
ITEM DEFINITION TABLE
OTHERS
126-4
126-2
PLAYLIST ELEMENT #1
...
PLAYLIST ELEMENT #y
OTHERS
126-5
126-6
PRE-COMMAND
126PR
POINTER TO ITEM
126PT
POST COMMAND
126PS
OTHERS

FIG. 6

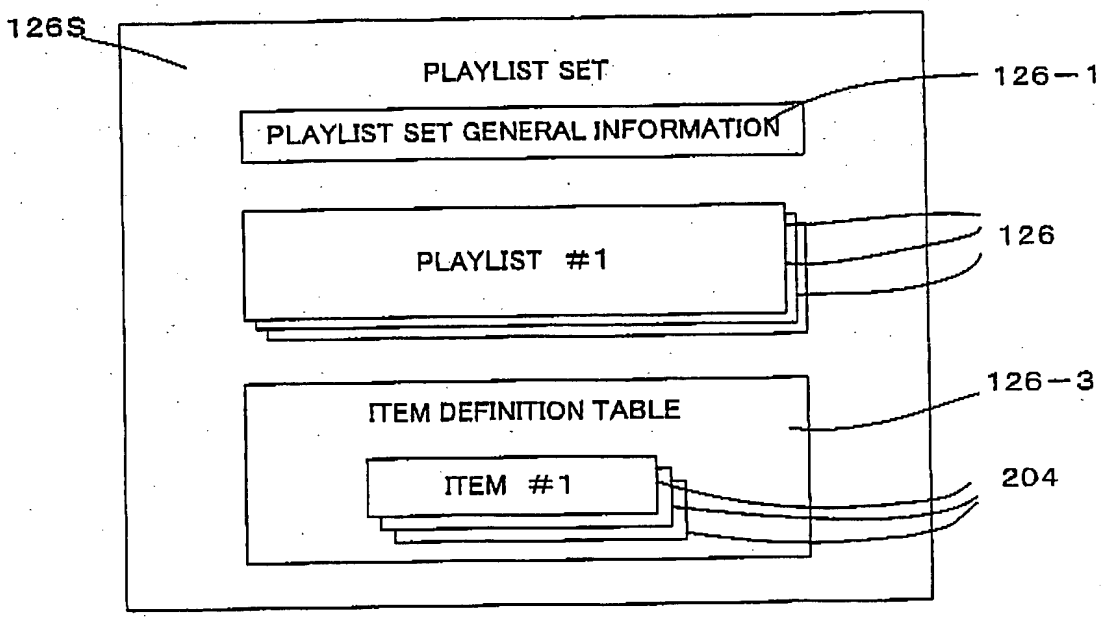

126S
PLAYLIST SET
126-1
PLAYLIST SET GENERAL INFORMATION
126
PLAYLIST #1
126-3
ITEM DEFINITION TABLE
204
ITEM #1

FIG. 7

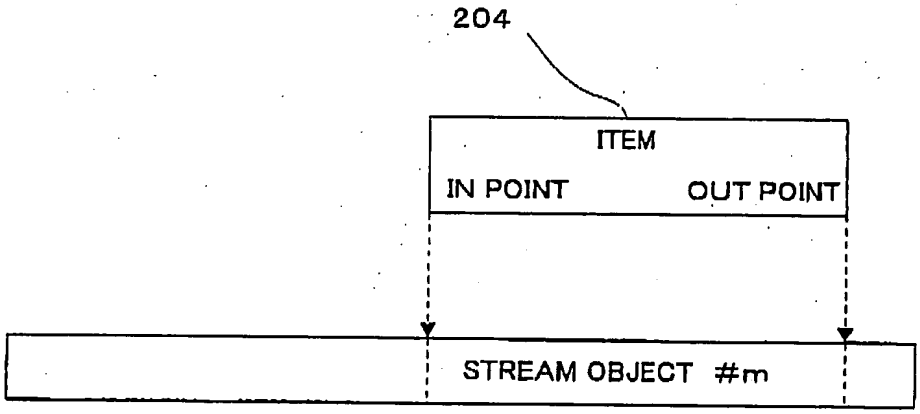


FIG. 8

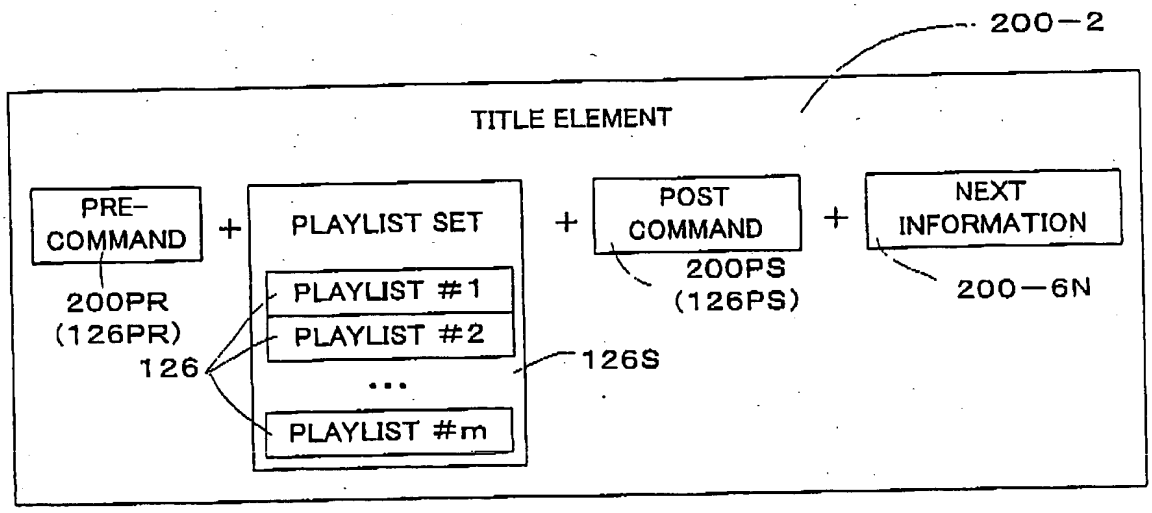

200-2
TITLE ELEMENT
PRE-COMMAND
+
PLAYLIST SET
+
POST COMMAND
+
NEXT INFORMATION
200PR
(126PR)
126
PLAYLIST #1
PLAYLIST #2
...
PLAYLIST #m
126S
200PS
(126PS)
200-6N

FIG. 9

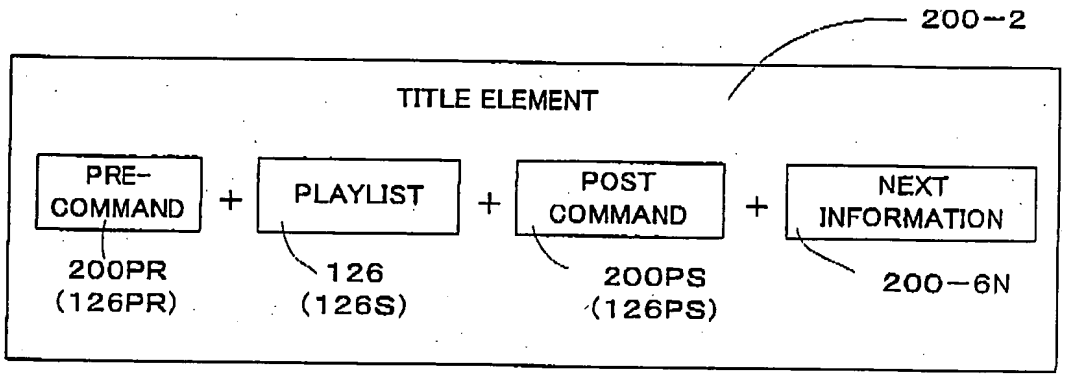

200-2
TITLE ELEMENT
PRE-COMMAND
+
PLAYLIST
+
POST COMMAND
+
NEXT INFORMATION
200PR (126PR)
126 (126S)
200PS (126PS)
200-6N

FIG. 10

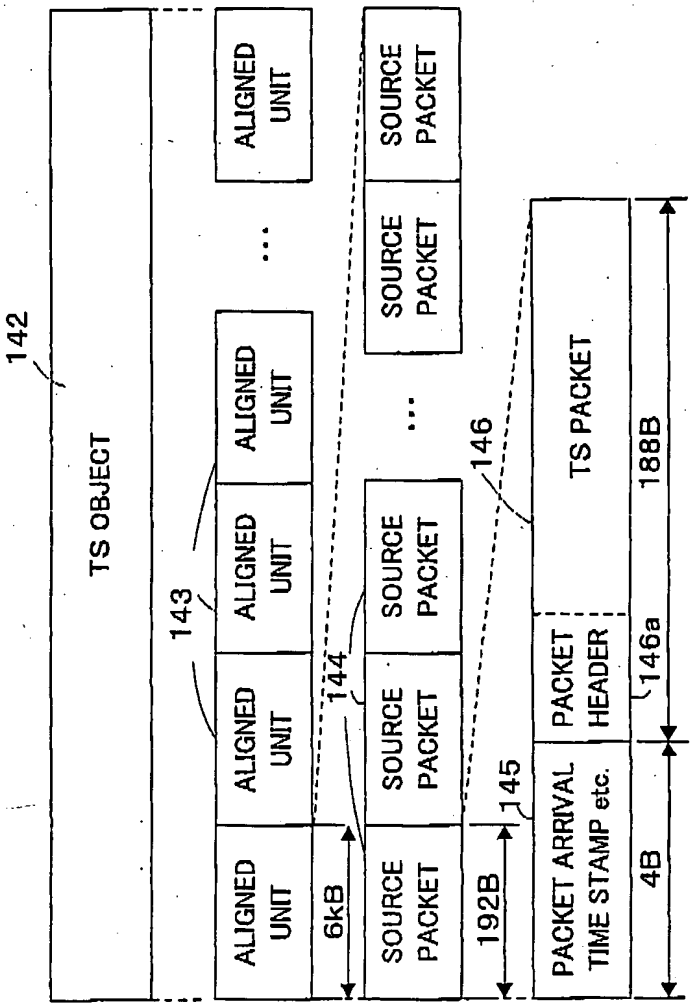

142
TS OBJECT
143
ALIGNED UNIT
ALIGNED UNIT
ALIGNED UNIT
ALIGNED UNIT
...
144
SOURCE PACKET
SOURCE PACKET
SOURCE PACKET
SOURCE PACKET
...
146
TS PACKET
PACKET HEADER
146a
188B
PACKET ARRIVAL TIME STAMP etc.
4B
145
192B
6kB

FIG. 11

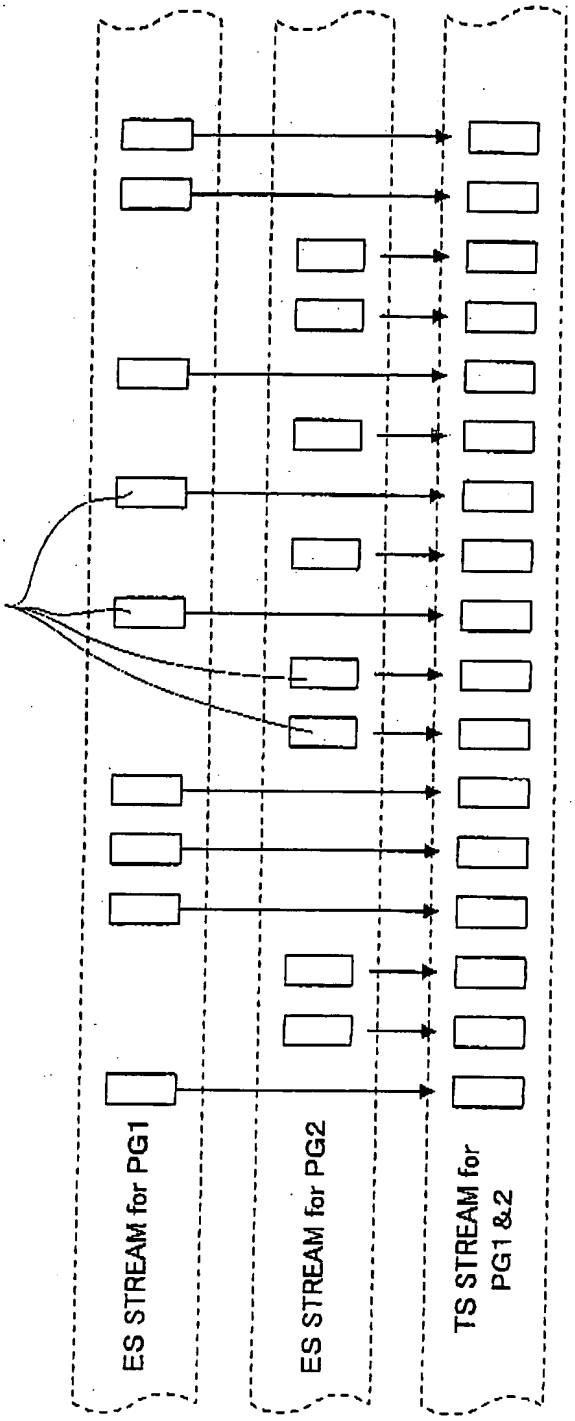

146:TS PACKET
ES STREAM for PG1
ES STREAM for PG2
TS STREAM for PG1 &2

FIG. 12

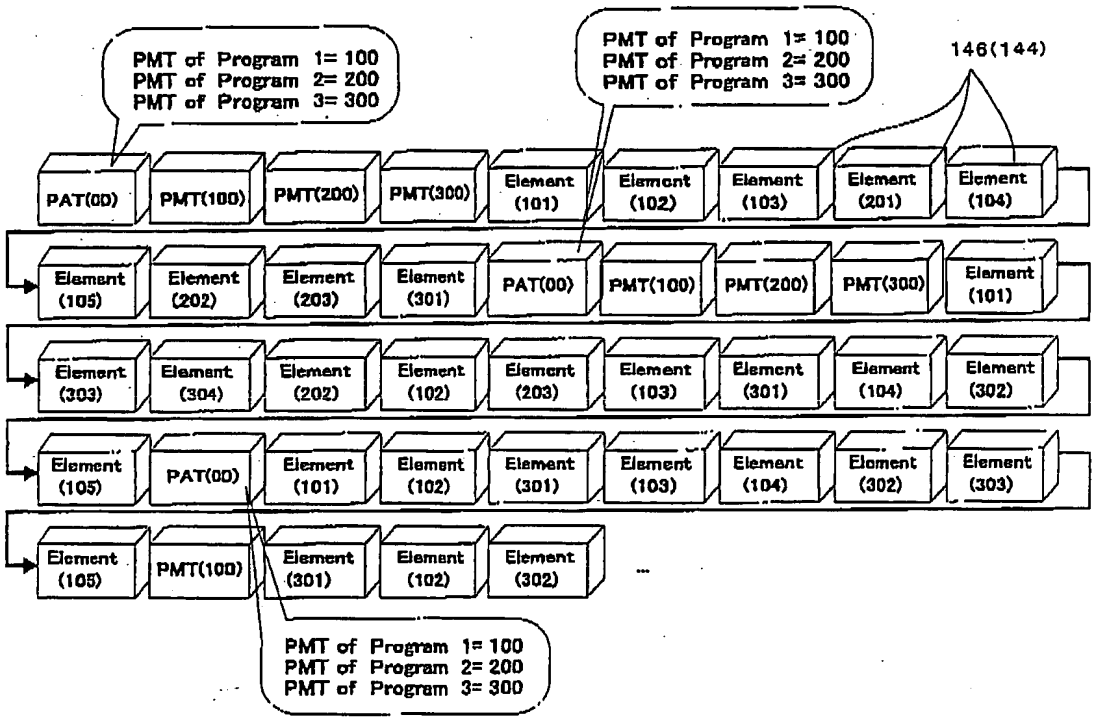

PMT of Program 1= 100
PMT of Program 2= 200
PMT of Program 3= 300
PMT of Program 1= 100
PMT of Program 2= 200
PMT of Program 3= 300
146(144)
PAT(00)
PMT(100)
PMT(200)
PMT(300)
Element (101)
Element (102)
Element (103)
Element (201)
Element (104)
Element (105)
Element (202)
Element (203)
Element (301)
PAT(00)
PMT(100)
PMT(200)
PMT(300)
Element (101)
Element (303)
Element (304)
Element (202)
Element (102)
Element (203)
Element (103)
Element (301)
Element (104)
Element (302)
Element (105)
PAT(00)
Element (101)
Element (102)
Element (301)
Element (103)
Element (104)
Element (302)
Element (303)
Element (105)
PMT(100)
Element (301)
Element (102)
Element (302)
PMT of Program 1= 100
PMT of Program 2= 200
PMT of Program 3= 300

FIG. 13

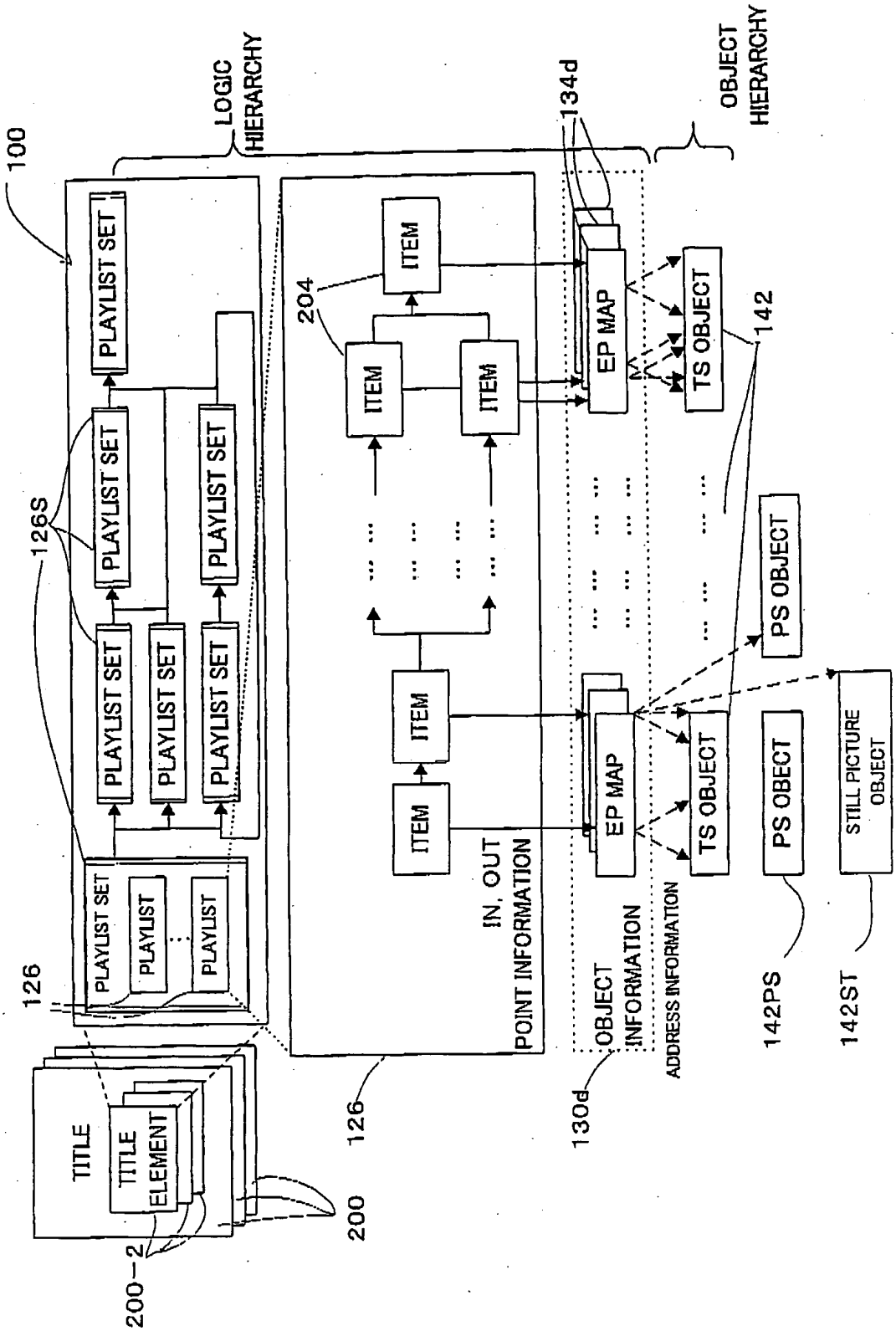

100
LOGIC HIERARCHY
OBJECT HIERARCHY
134d
PLAYLIST SET
126S
PLAYLIST
126
TITLE
TITLE ELEMENT
200
200-2
204
ITEM
EP MAP
TS OBJECT
142
PS OBJECT
STILL PICTURE OBJECT
142PS
142ST
IN, OUT POINT INFORMATION
OBJECT INFORMATION
ADDRESS INFORMATION
130d

FIG. 14

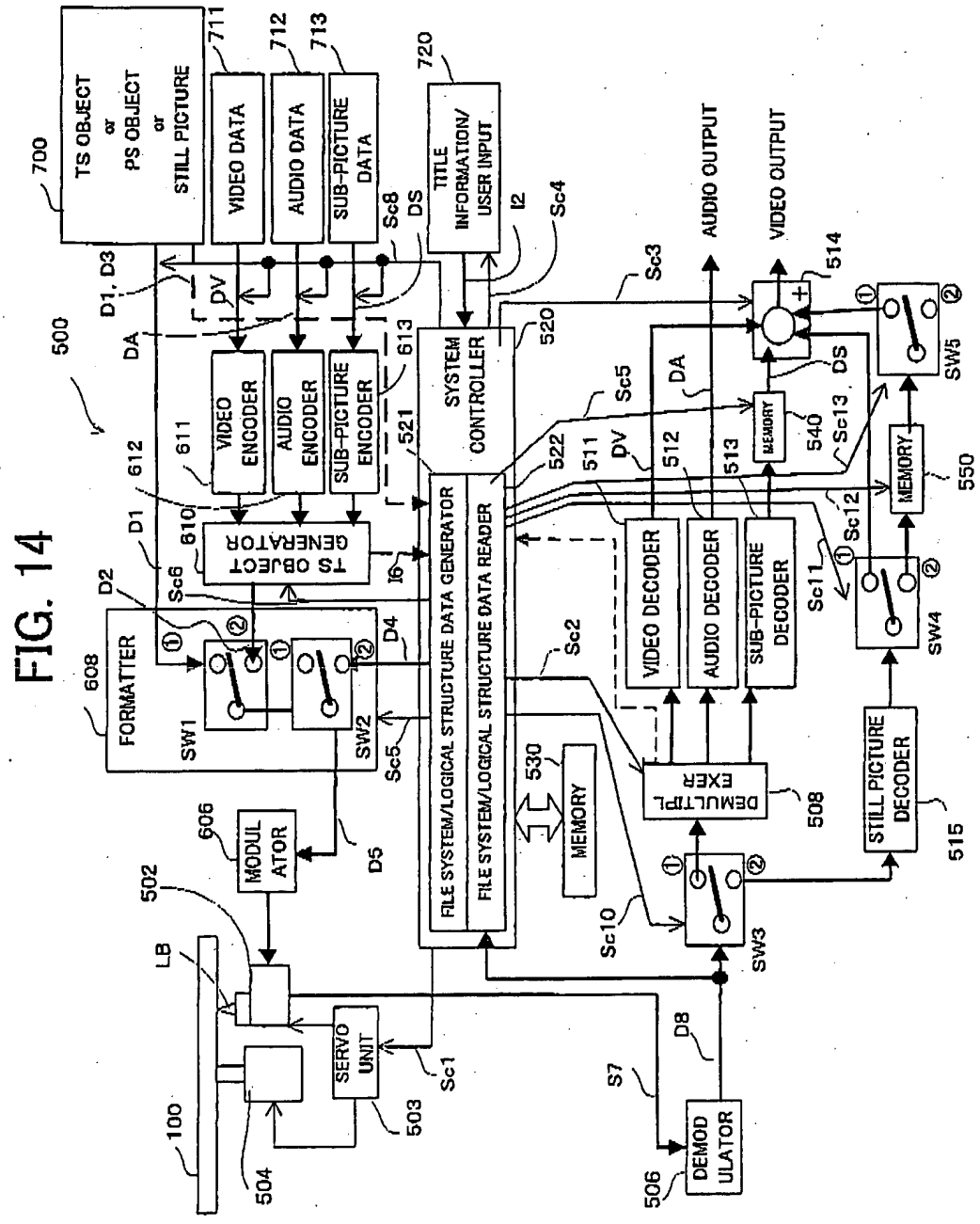

700
TS OBJECT or PS OBJECT or STILL PICTURE
711
VIDEO DATA
712
AUDIO DATA
713
SUB-PICTURE DATA
720
TITLE INFORMATION/ USER INPUT
AUDIO OUTPUT
VIDEO OUTPUT
500
VIDEO ENCODER
AUDIO ENCODER
SUB-PICTURE ENCODER
SYSTEM CONTROLLER
520
611
612
613
521
610
TS OBJECT GENERATOR
FILE SYSTEM/LOGICAL STRUCTURE DATA GENERATOR
FILE SYSTEM/LOGICAL STRUCTURE DATA READER
608
FORMATTER
SW1
SW2
606
MODUL ATOR
530
MEMORY
VIDEO DECODER
AUDIO DECODER
SUB-PICTURE DECODER
DEMULTIPLEXER
508
STILL PICTURE DECODER
515
514
SW5
SW4
SW3
550
540
502
LB
100
504
SERVO UNIT
503
Sc1
506
DEMOD ULATOR
D1, D3
DV
DA
DS
I2
Sc4
Sc3
Sc5
Sc8
Sc10
Sc11
Sc12
Sc13
D1
D2
D4
D5
D8
S7
I6
Sc6
Sc2

FIG. 15

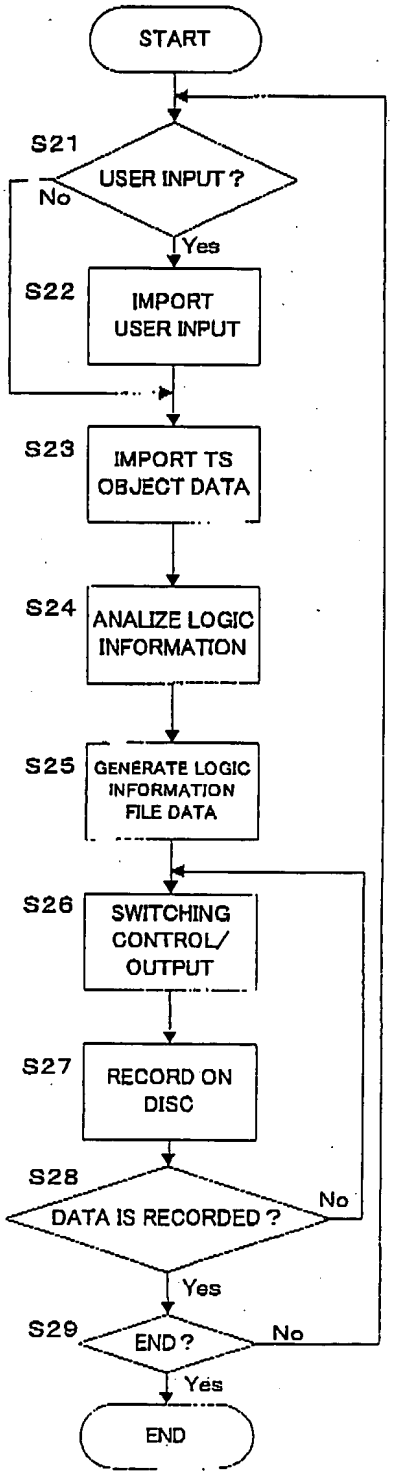
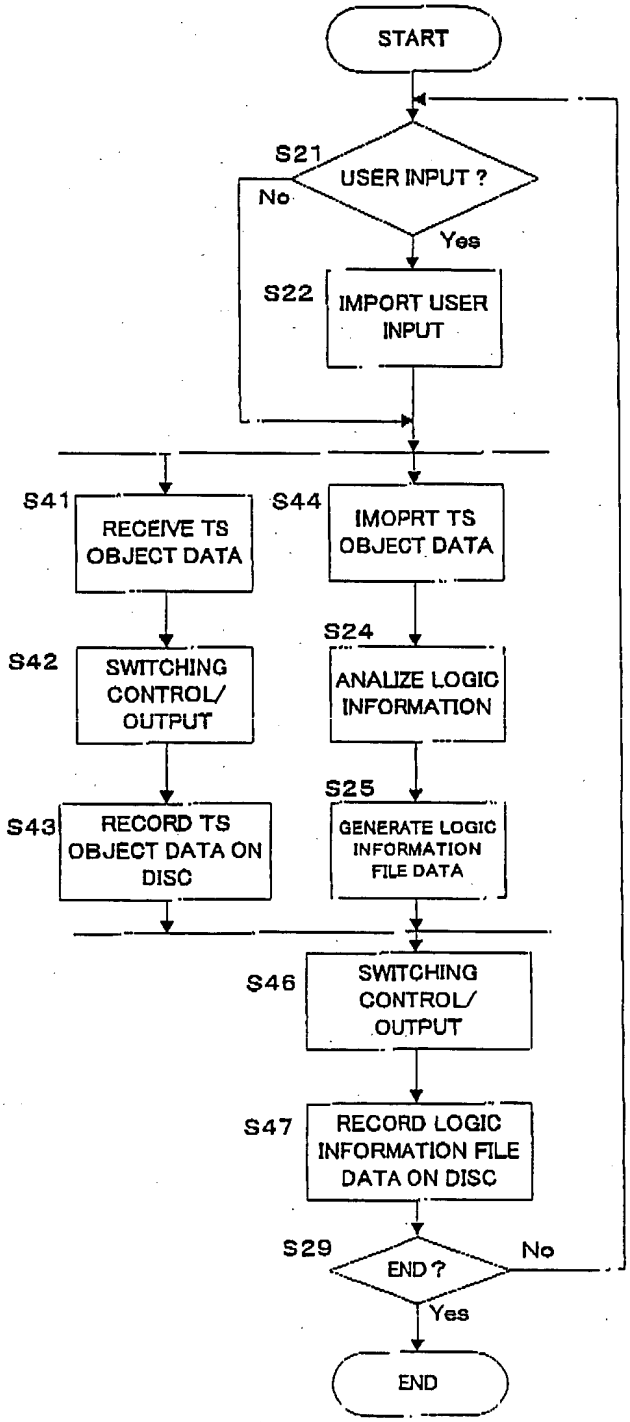
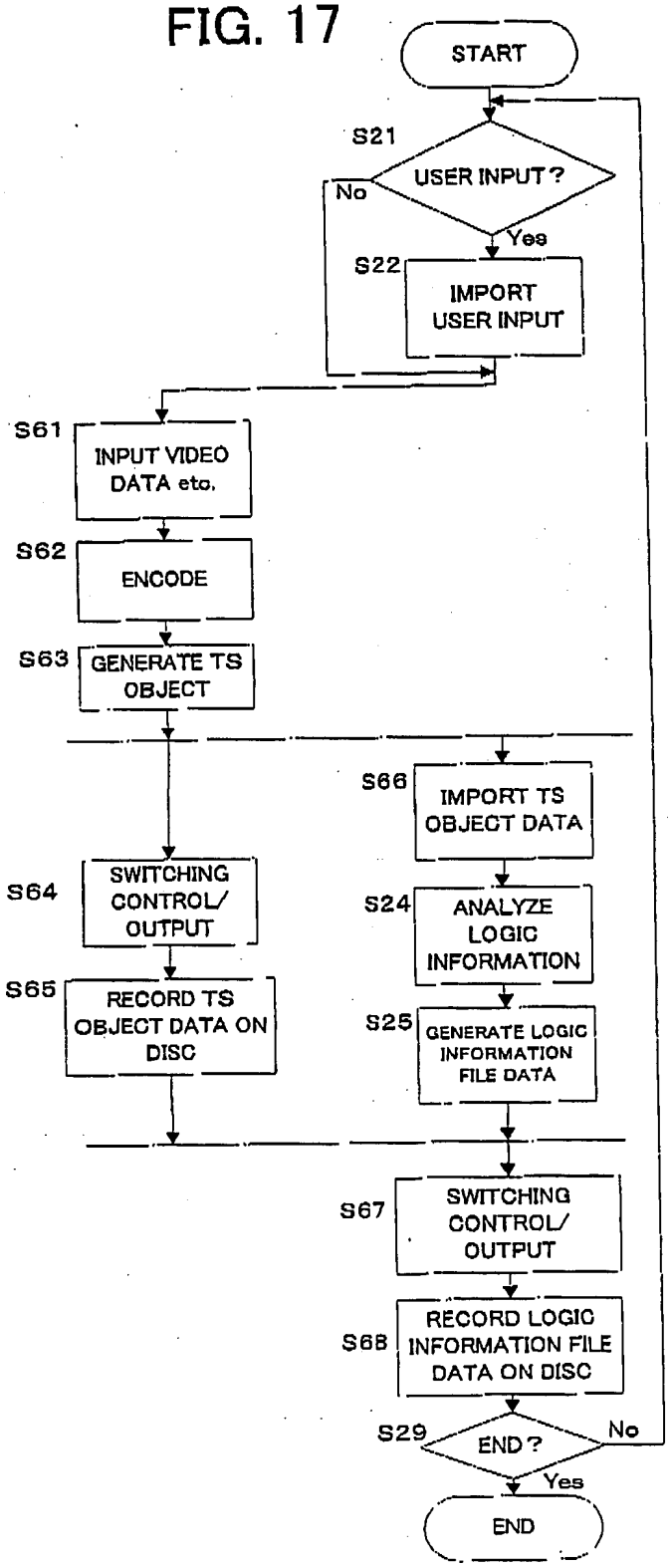

START
S21
USER INPUT ?
No
Yes
S22
IMPORT USER INPUT
S23
IMPORT TS OBJECT DATA
S24
ANALIZE LOGIC INFORMATION
S25
GENERATE LOGIC INFORMATION FILE DATA
S26
SWITCHING CONTROL/ OUTPUT
S27
RECORD ON DISC
S28
DATA IS RECORDED ?
No
Yes
S29
END ?
No
Yes
END

FIG. 16


START
S21
USER INPUT ?
No
Yes
S22
IMPORT USER INPUT
S41
RECEIVE TS OBJECT DATA
S44
IMOPRT TS OBJECT DATA
S42
SWITCHING CONTROL/ OUTPUT
S24
ANALIZE LOGIC INFORMATION
S43
RECORD TS OBJECT DATA ON DISC
S25
GENERATE LOGIC INFORMATION FILE DATA
S46
SWITCHING CONTROL/ OUTPUT
S47
RECORD LOGIC INFORMATION FILE DATA ON DISC
S29
END ?
No
Yes
END

10/529867

FIG. 17



10/529867

FIG. 18

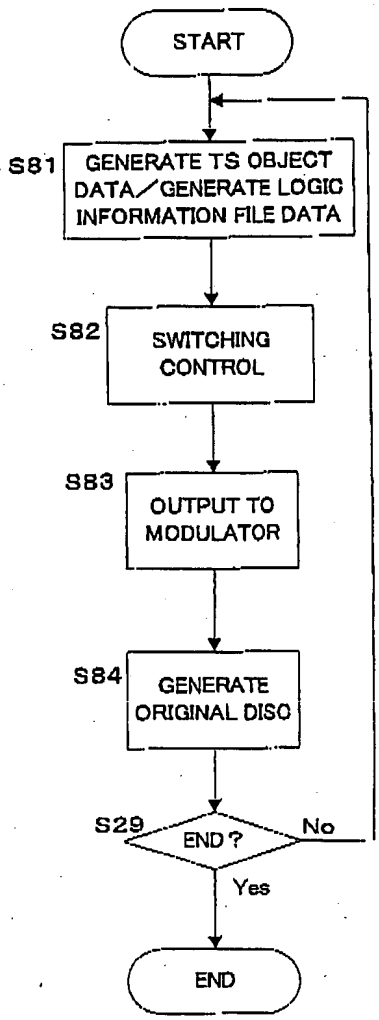


FIG. 19

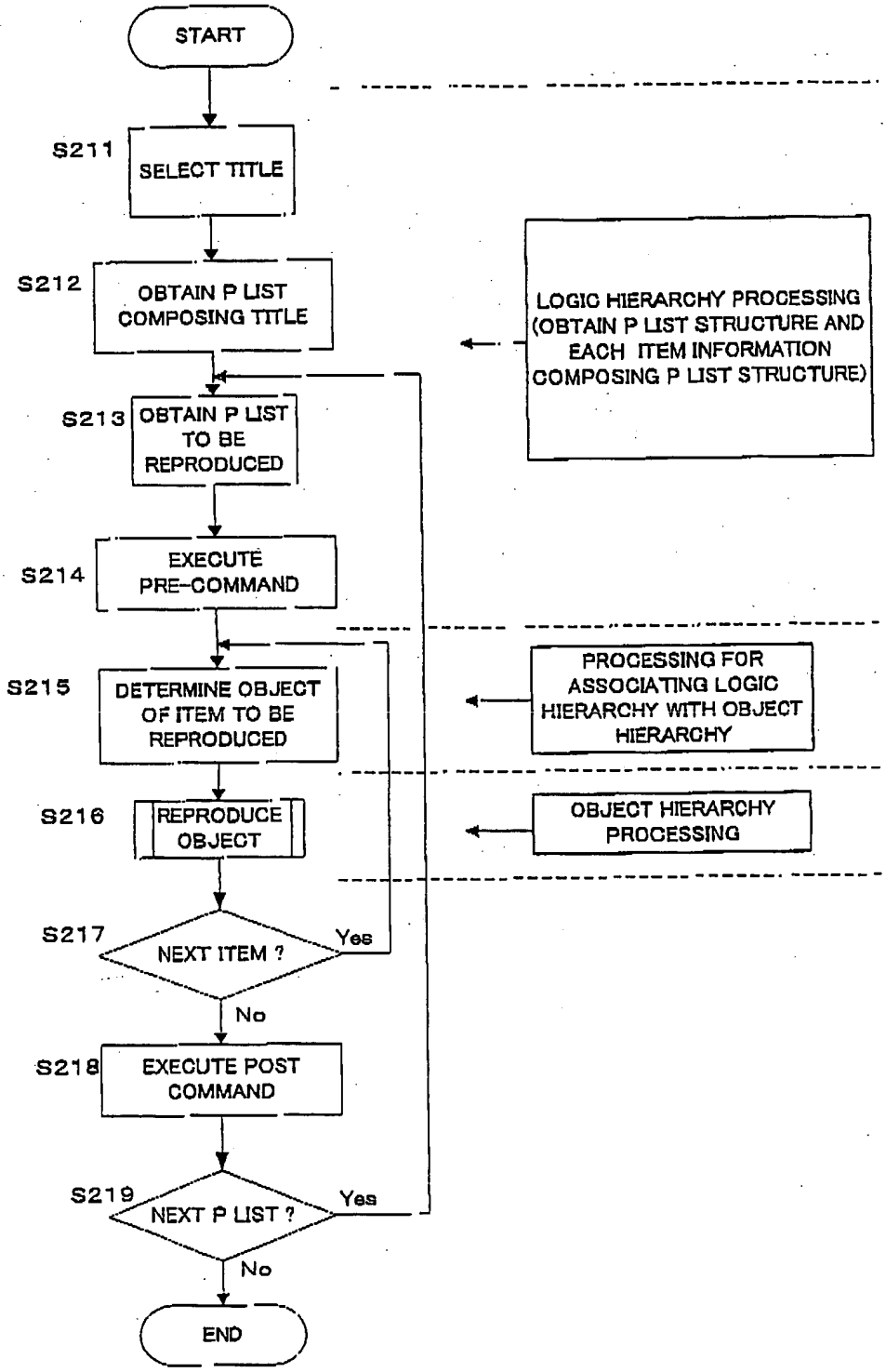

START
S211
SELECT TITLE
S212
OBTAIN P LIST COMPOSING TITLE
LOGIC HIERARCHY PROCESSING (OBTAIN P LIST STRUCTURE AND EACH ITEM INFORMATION COMPOSING P LIST STRUCTURE)
S213
OBTAIN P LIST TO BE REPRODUCED
S214
EXECUTE PRE-COMMAND
S215
DETERMINE OBJECT OF ITEM TO BE REPRODUCED
PROCESSING FOR ASSOCIATING LOGIC HIERARCHY WITH OBJECT HIERARCHY
S216
REPRODUCE OBJECT
OBJECT HIERARCHY PROCESSING
S217
NEXT ITEM ?
Yes
No
S218
EXECUTE POST COMMAND
S219
NEXT P LIST ?
Yes
No
END

図20(a)

721 : SP CONTROL INFORMATION

SCP HEADER	SP DATA IDENTIFIER
	SP DATA POSITION INFORMATION
	OTHER INFORMATION
SF CONTROL PARAMETER	SF DATA DISPLAY START TIME POINT
	SF DATA DISPLAY END TIME POINT
	OTHER INFORMATION (SCP BUTTON INFORMATION, HIGHLIGHT INFORMATION)

図20(b)

722 : SP DATA STRUCTURE

STRUCTURE INFORMATION	SP DATA IDENTIFIER
	SP DATA LENGTH
	OTHER INFORMATION
SP DATA	IMAGE DATA (Bitmap, JPEG etc.)
	OTHER INFORMATION (SPD BUTTON INFORMATION, HIGHLIGHT INFORMATION)

10/529867

FIG.21 (a)

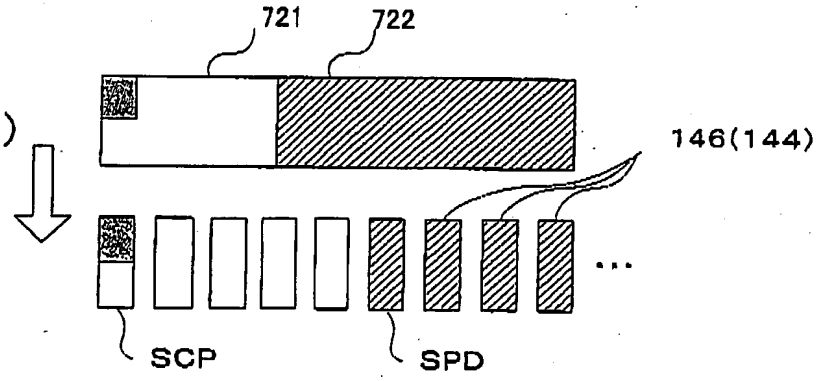


FIG.21 (b)

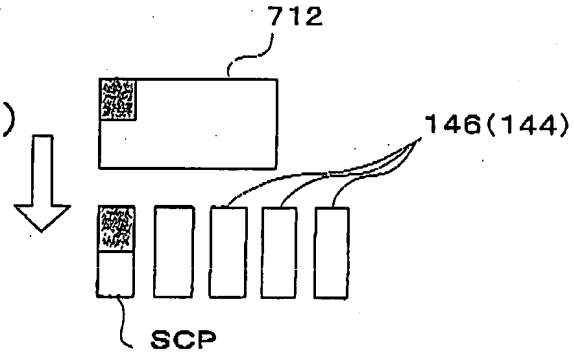
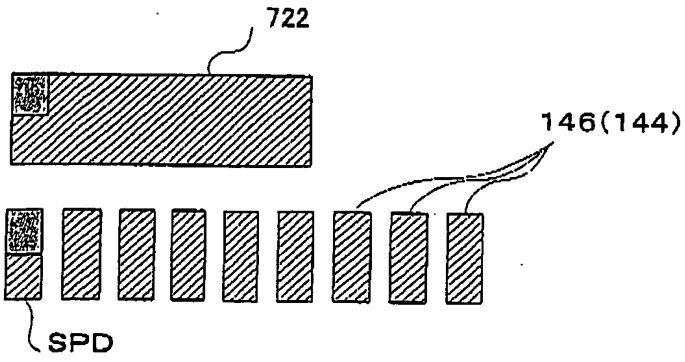


FIG.21 (c)



10/529867

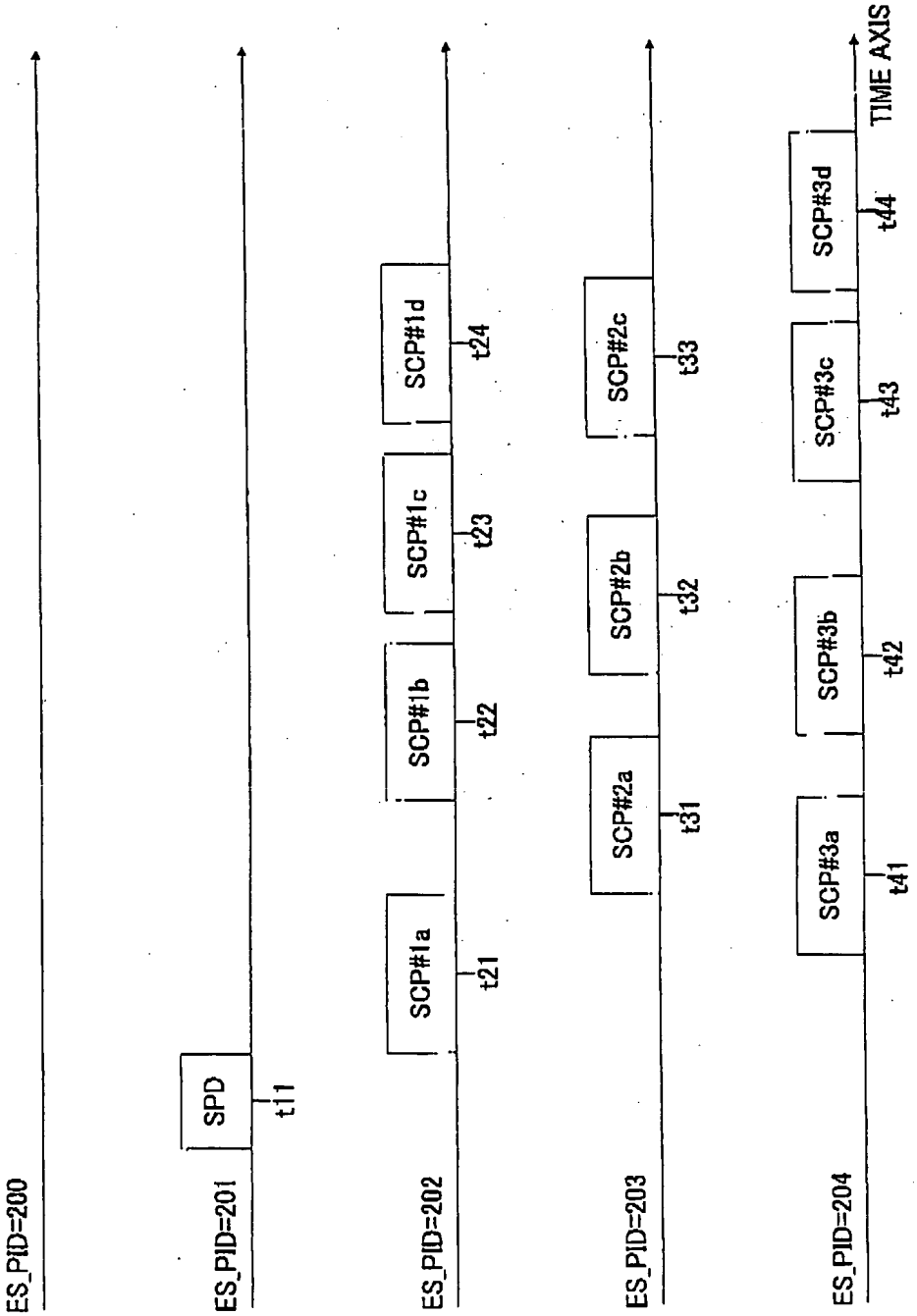


FIG. 22

FIG. 23

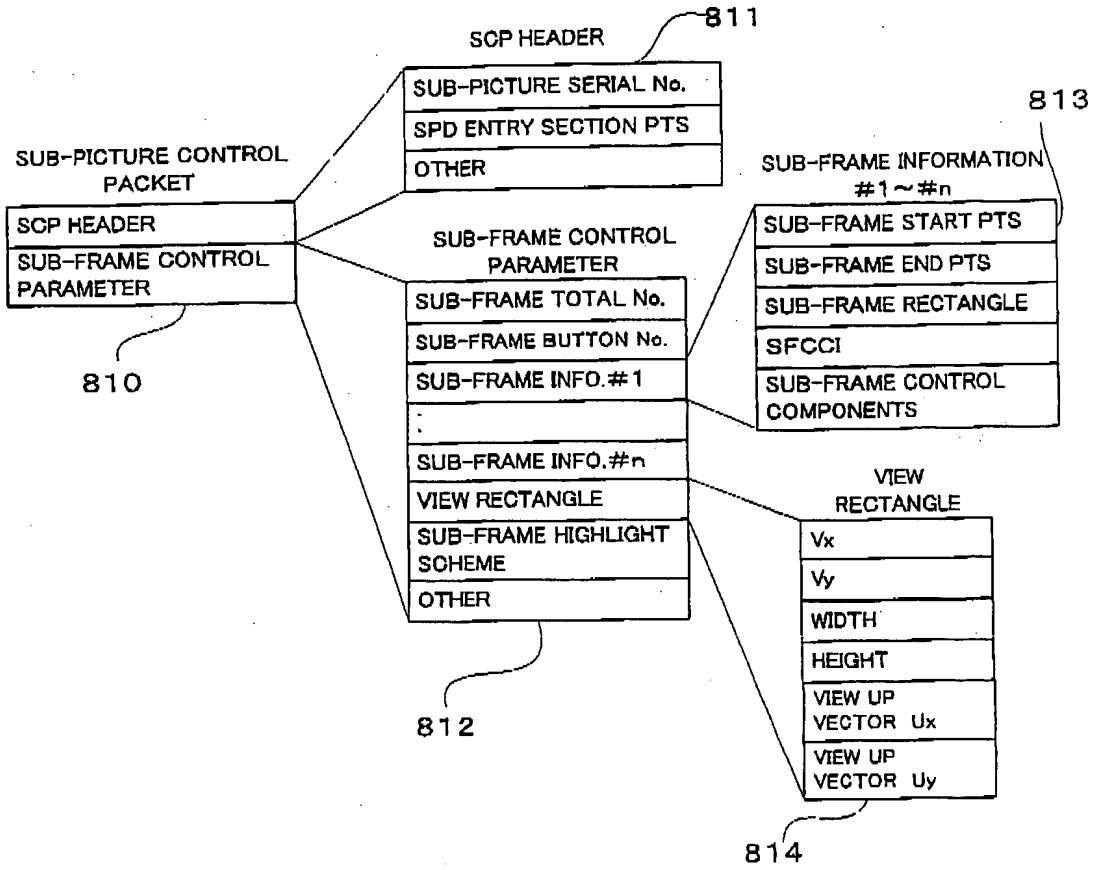

SUB-PICTURE CONTROL PACKET
SCP HEADER
SUB-FRAME CONTROL PARAMETER
810
SCP HEADER
811
SUB-PICTURE SERIAL No.
SPD ENTRY SECTION PTS
OTHER
SUB-FRAME CONTROL PARAMETER
SUB-FRAME TOTAL No.
SUB-FRAME BUTTON No.
SUB-FRAME INFO.#1
SUB-FRAME INFO.#n
VIEW RECTANGLE
SUB-FRAME HIGHLIGHT SCHEME
OTHER
812
813
SUB-FRAME INFORMATION #1~#n
SUB-FRAME START PTS
SUB-FRAME END PTS
SUB-FRAME RECTANGLE
SFCCI
SUB-FRAME CONTROL COMPONENTS
VIEW RECTANGLE
Vx
Vy
WIDTH
HEIGHT
VIEW UP VECTOR Ux
VIEW UP VECTOR Uy
814

FIG. 24

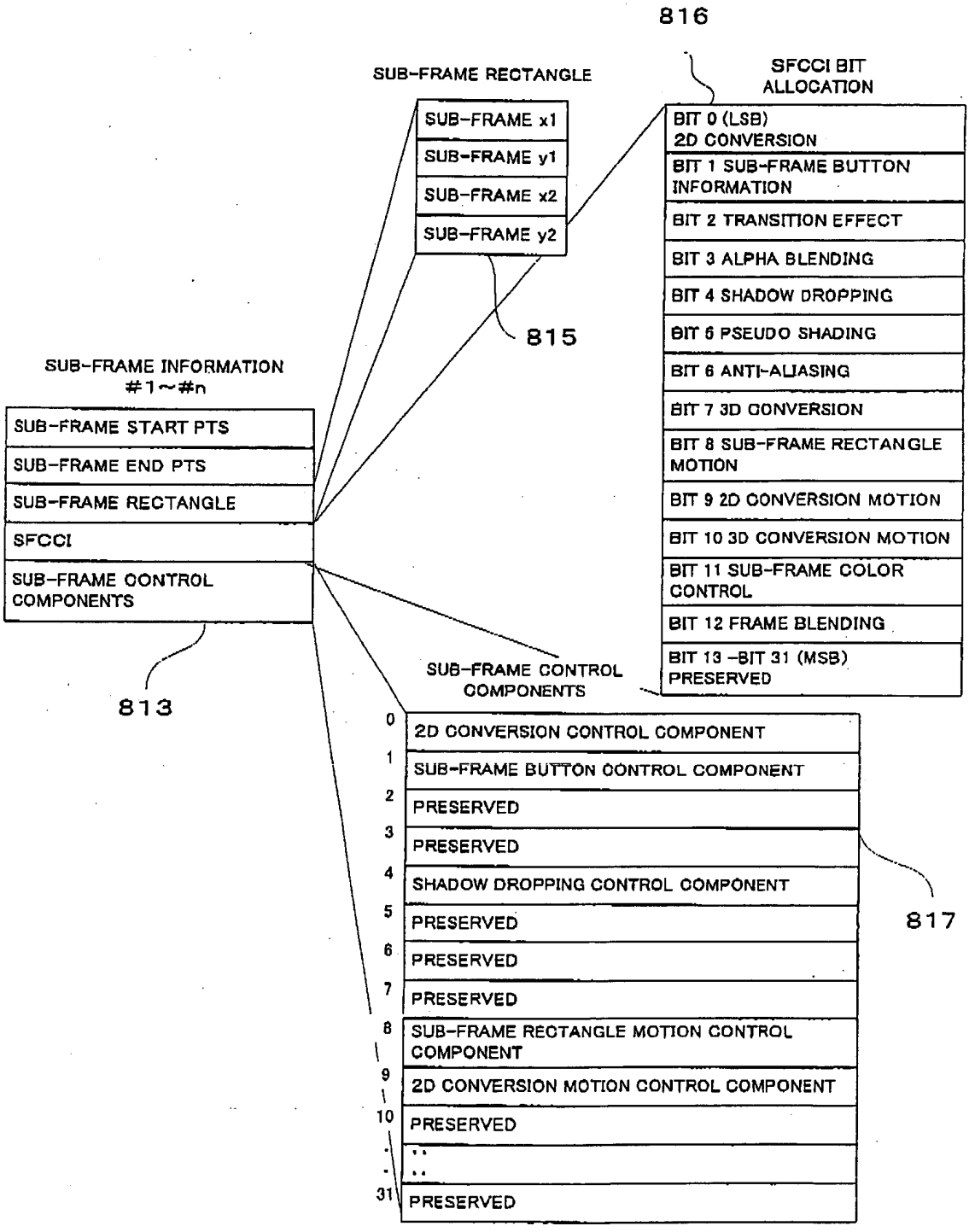

816
SUB-FRAME RECTANGLE
SFCCI BIT ALLOCATION
SUB-FRAME x1
SUB-FRAME y1
SUB-FRAME x2
SUB-FRAME y2
BIT 0 (LSB) 2D CONVERSION
BIT 1 SUB-FRAME BUTTON INFORMATION
BIT 2 TRANSITION EFFECT
BIT 3 ALPHA BLENDING
BIT 4 SHADOW DROPPING
BIT 5 PSEUDO SHADING
BIT 6 ANTI-ALIASING
BIT 7 3D CONVERSION
BIT 8 SUB-FRAME RECTANGLE MOTION
BIT 9 2D CONVERSION MOTION
BIT 10 3D CONVERSION MOTION
BIT 11 SUB-FRAME COLOR CONTROL
BIT 12 FRAME BLENDING
BIT 13 –BIT 31 (MSB) PRESERVED
815
SUB-FRAME INFORMATION #1~#n
SUB-FRAME START PTS
SUB-FRAME END PTS
SUB-FRAME RECTANGLE
SFCCI
SUB-FRAME CONTROL COMPONENTS
813
SUB-FRAME CONTROL COMPONENTS
0 2D CONVERSION CONTROL COMPONENT
1 SUB-FRAME BUTTON CONTROL COMPONENT
2 PRESERVED
3 PRESERVED
4 SHADOW DROPPING CONTROL COMPONENT
5 PRESERVED
6 PRESERVED
7 PRESERVED
8 SUB-FRAME RECTANGLE MOTION CONTROL COMPONENT
9 2D CONVERSION MOTION CONTROL COMPONENT
10 PRESERVED
31 PRESERVED
817

FIG. 25

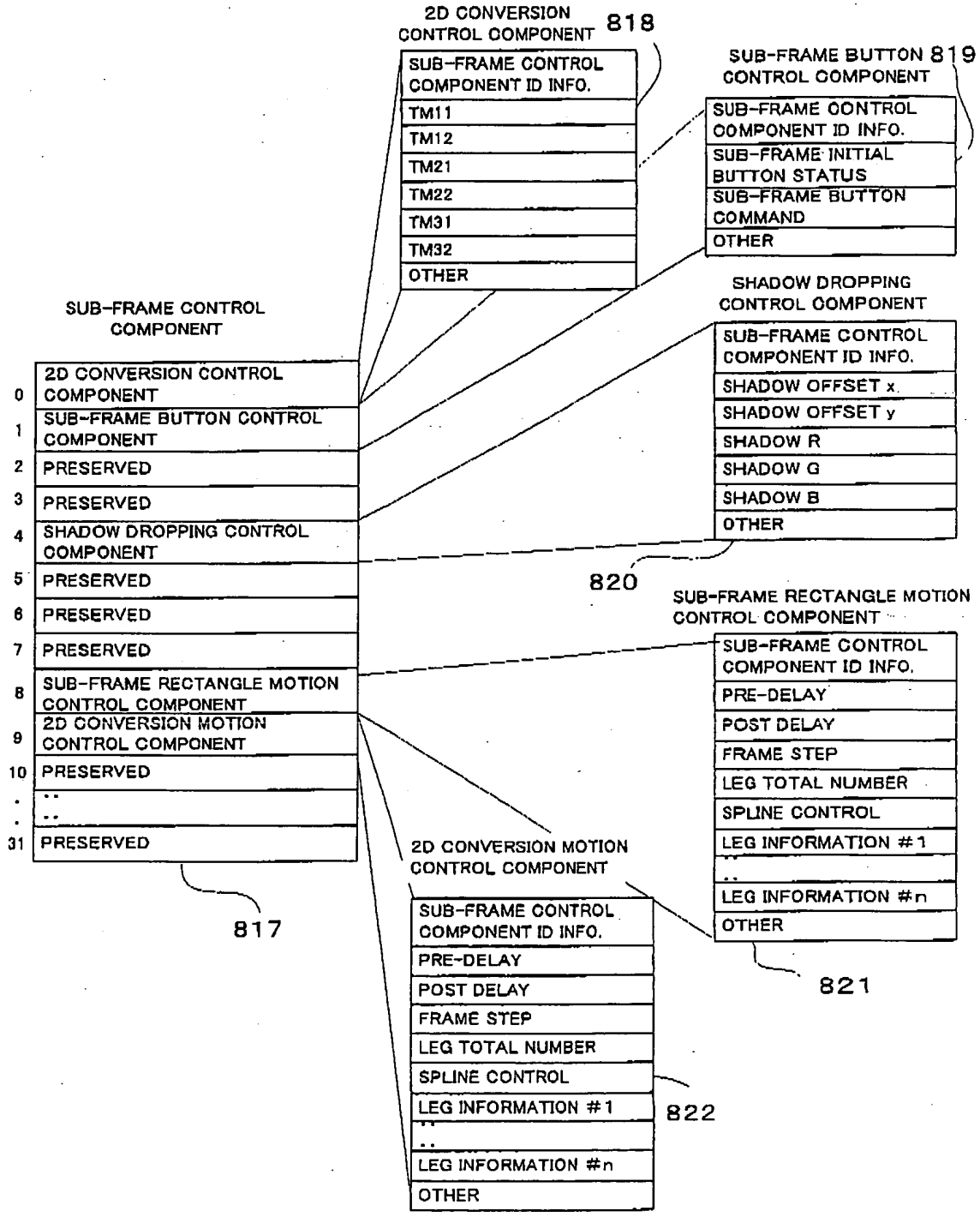

SUB-FRAME CONTROL COMPONENT
0 2D CONVERSION CONTROL COMPONENT
1 SUB-FRAME BUTTON CONTROL COMPONENT
2 PRESERVED
3 PRESERVED
4 SHADOW DROPPING CONTROL COMPONENT
5 PRESERVED
6 PRESERVED
7 PRESERVED
8 SUB-FRAME RECTANGLE MOTION CONTROL COMPONENT
9 2D CONVERSION MOTION CONTROL COMPONENT
10 PRESERVED
..
..
31 PRESERVED
817
2D CONVERSION CONTROL COMPONENT
818
SUB-FRAME CONTROL COMPONENT ID INFO.
TM11
TM12
TM21
TM22
TM31
TM32
OTHER
SUB-FRAME BUTTON CONTROL COMPONENT
819
SUB-FRAME CONTROL COMPONENT ID INFO.
SUB-FRAME INITIAL BUTTON STATUS
SUB-FRAME BUTTON COMMAND
OTHER
SHADOW DROPPING CONTROL COMPONENT
SUB-FRAME CONTROL COMPONENT ID INFO.
SHADOW OFFSET x
SHADOW OFFSET y
SHADOW R
SHADOW G
SHADOW B
OTHER
820
SUB-FRAME RECTANGLE MOTION CONTROL COMPONENT
SUB-FRAME CONTROL COMPONENT ID INFO.
PRE-DELAY
POST DELAY
FRAME STEP
LEG TOTAL NUMBER
SPLINE CONTROL
LEG INFORMATION #1
..
LEG INFORMATION #n
OTHER
821
2D CONVERSION MOTION CONTROL COMPONENT
SUB-FRAME CONTROL COMPONENT ID INFO.
PRE-DELAY
POST DELAY
FRAME STEP
LEG TOTAL NUMBER
SPLINE CONTROL
LEG INFORMATION #1
..
LEG INFORMATION #n
OTHER
822

FIG. 26

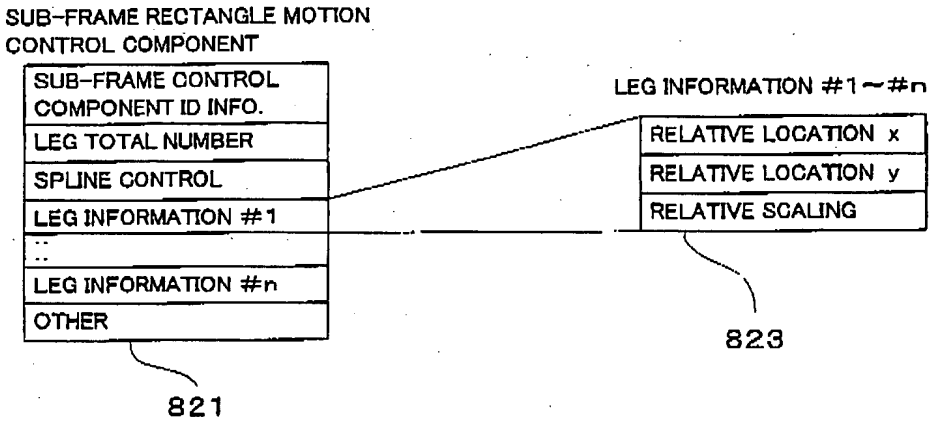

SUB-FRAME RECTANGLE MOTION CONTROL COMPONENT
SUB-FRAME CONTROL COMPONENT ID INFO.
LEG TOTAL NUMBER
SPLINE CONTROL
LEG INFORMATION #1
..
LEG INFORMATION #n
OTHER
821
LEG INFORMATION #1~#n
RELATIVE LOCATION x
RELATIVE LOCATION y
RELATIVE SCALING
823

FIG. 27

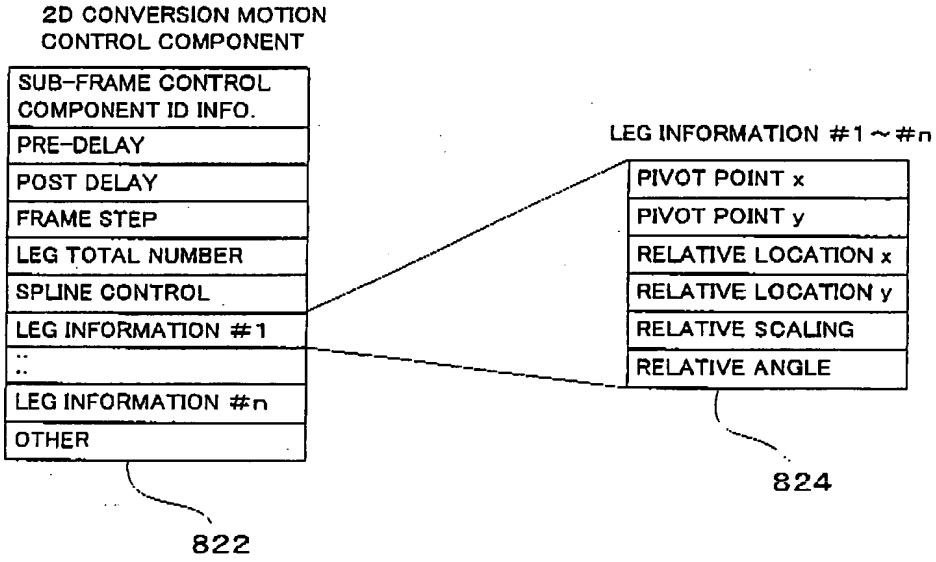

2D CONVERSION MOTION CONTROL COMPONENT
SUB-FRAME CONTROL COMPONENT ID INFO.
PRE-DELAY
POST DELAY
FRAME STEP
LEG TOTAL NUMBER
SPLINE CONTROL
LEG INFORMATION #1
::
LEG INFORMATION #n
OTHER
822
LEG INFORMATION #1 ~ #n
PIVOT POINT x
PIVOT POINT y
RELATIVE LOCATION x
RELATIVE LOCATION y
RELATIVE SCALING
RELATIVE ANGLE
824

FIG. 28

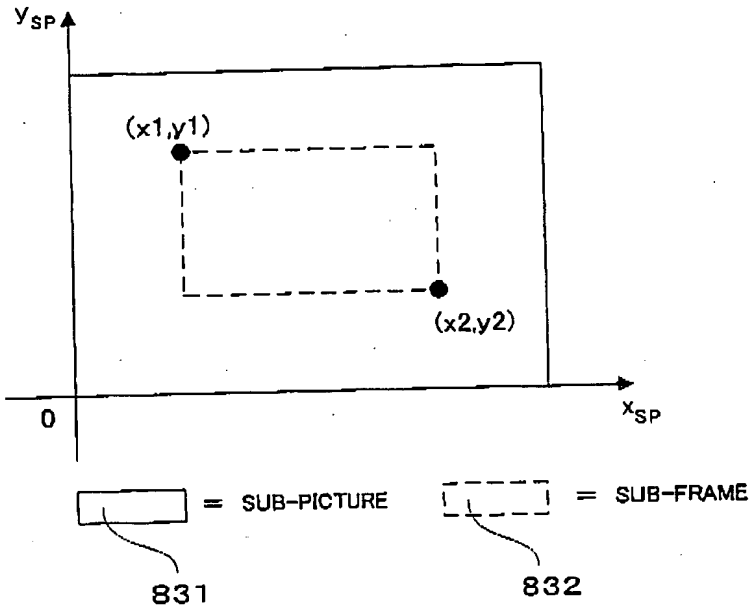


FIG. 29

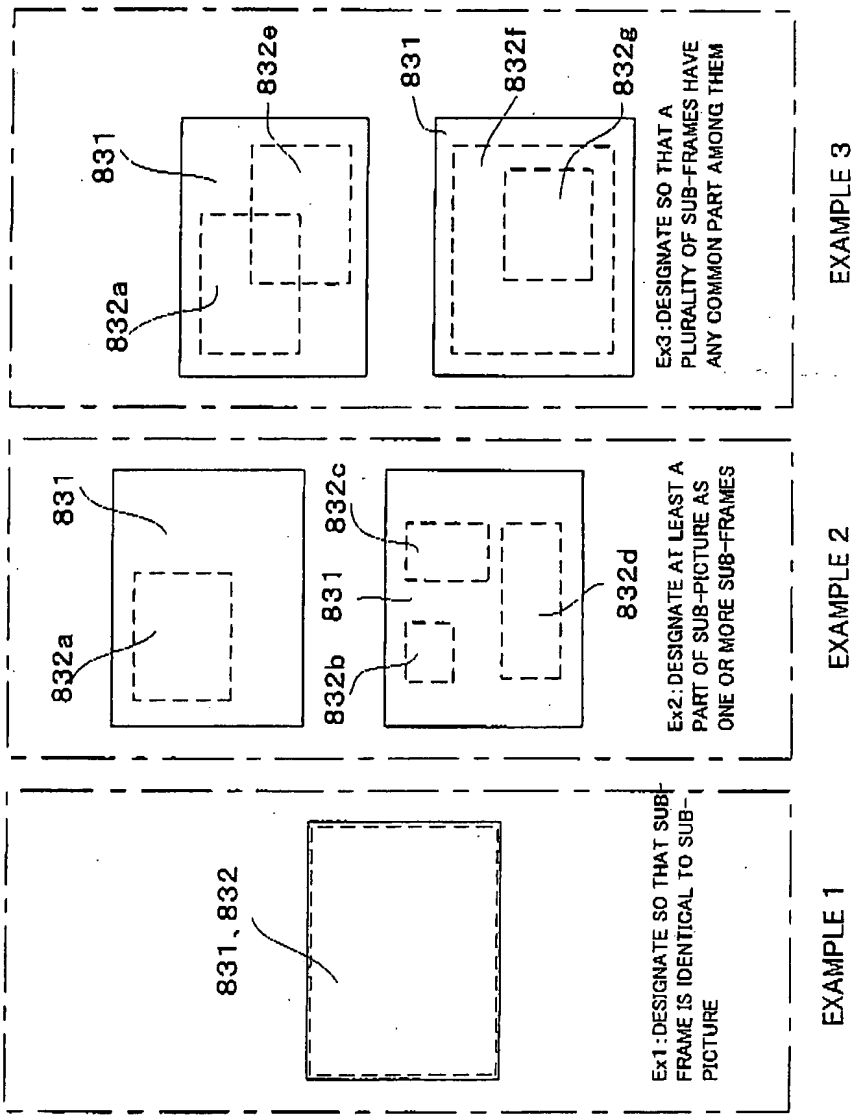

831
832a
832e
831
832f
832g
Ex3 : DESIGNATE SO THAT A PLURALITY OF SUB-FRAMES HAVE ANY COMMON PART AMONG THEM
EXAMPLE 3
831
832a
832c
831
832b
832d
Ex2 : DESIGNATE AT LEAST A PART OF SUB-PICTURE AS ONE OR MORE SUB-FRAMES
EXAMPLE 2
831, 832
Ex1 : DESIGNATE SO THAT SUB-FRAME IS IDENTICAL TO SUB-PICTURE
EXAMPLE 1

FIG. 30

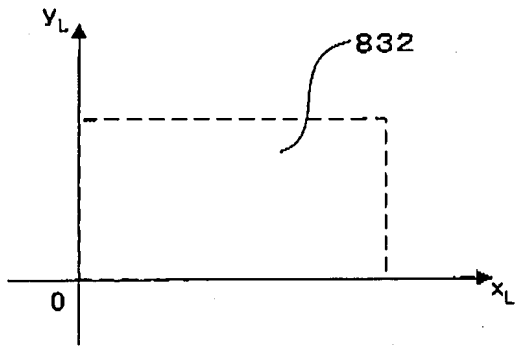


FIG. 31

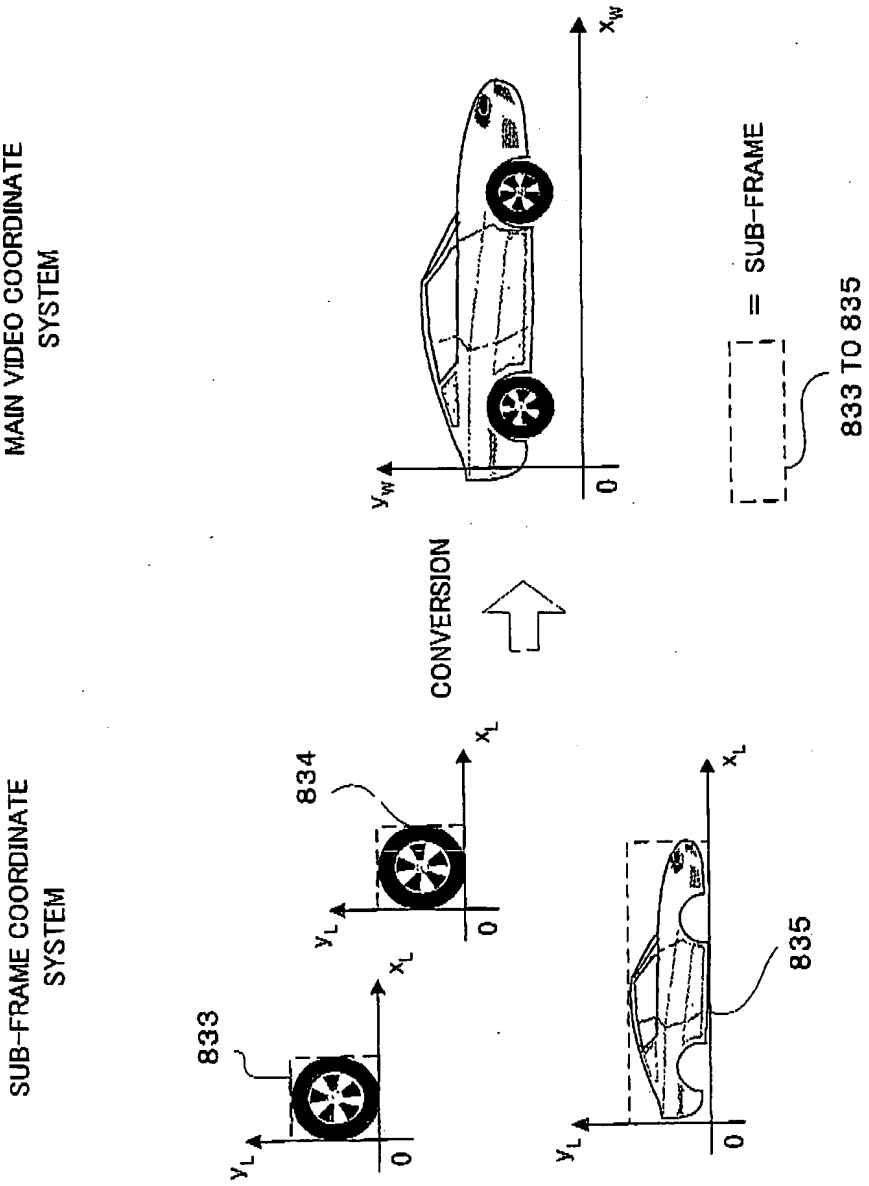

MAIN VIDEO COORDINATE SYSTEM
SUB-FRAME COORDINATE SYSTEM
CONVERSION
= SUB-FRAME
833 TO 835
833
834
835
x_W
y_W
x_L
y_L
0

FIG. 32

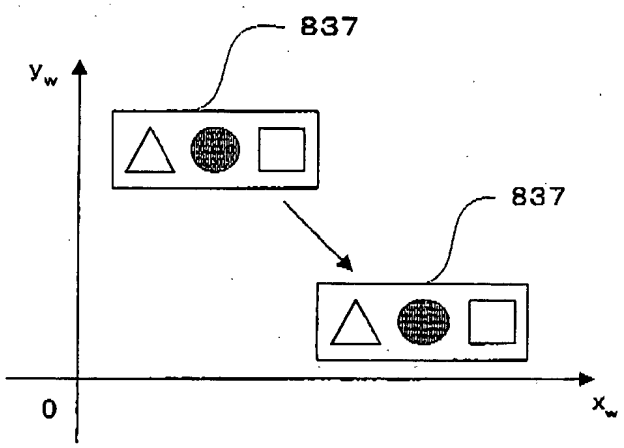


FIG. 33

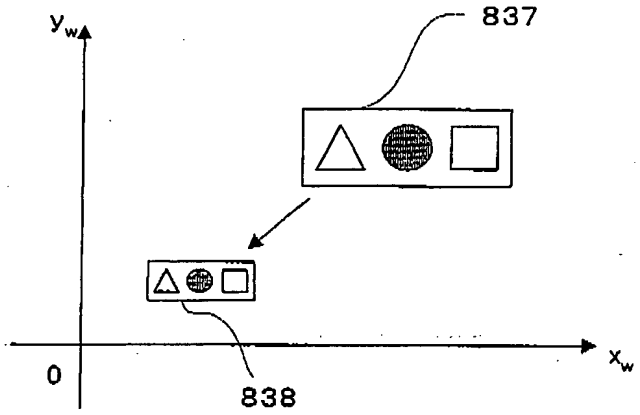


FIG. 34

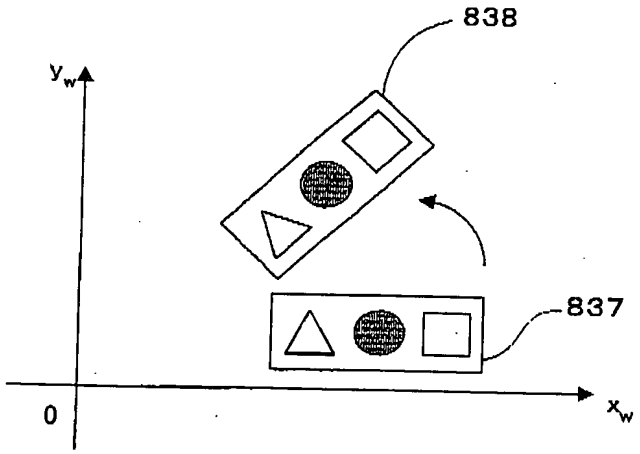
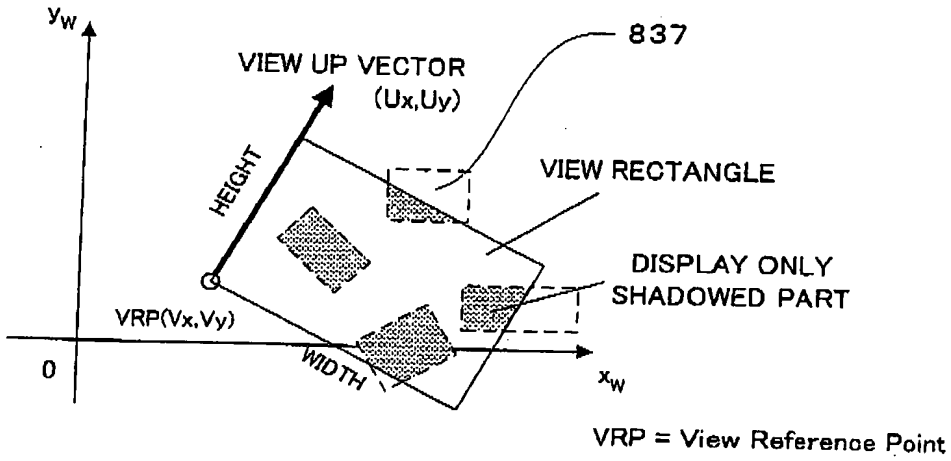
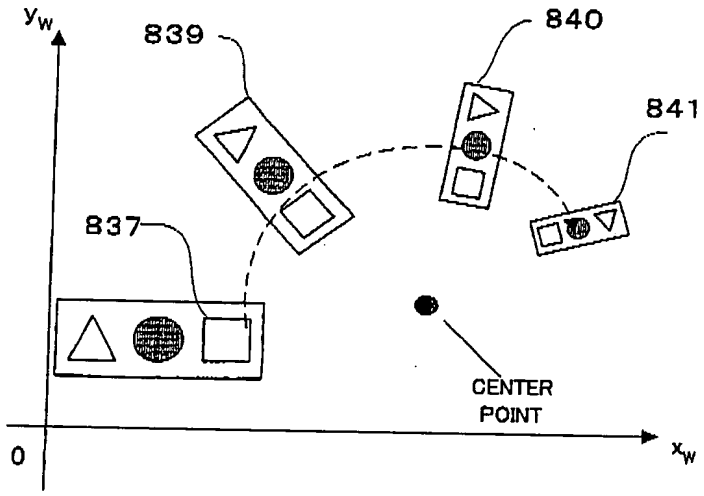


FIG. 35



VRP = View Reference Point

FIG. 36



PARAMETER
- RELATIVE ANGLE = 150°
- RELATIVE SCALE = 0.5
- RELATIVE LOCATION = (0,0)

FIG. 37

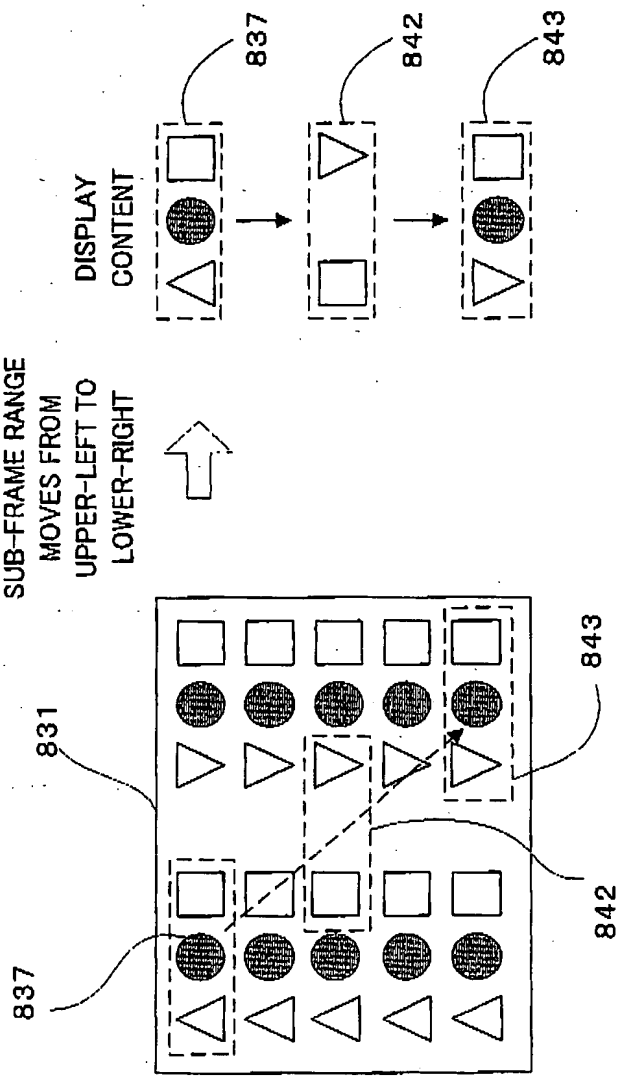

DISPLAY CONTENT
837
842
843
SUB-FRAME RANGE MOVES FROM UPPER-LEFT TO LOWER-RIGHT
831
837
842
843

FIG. 38

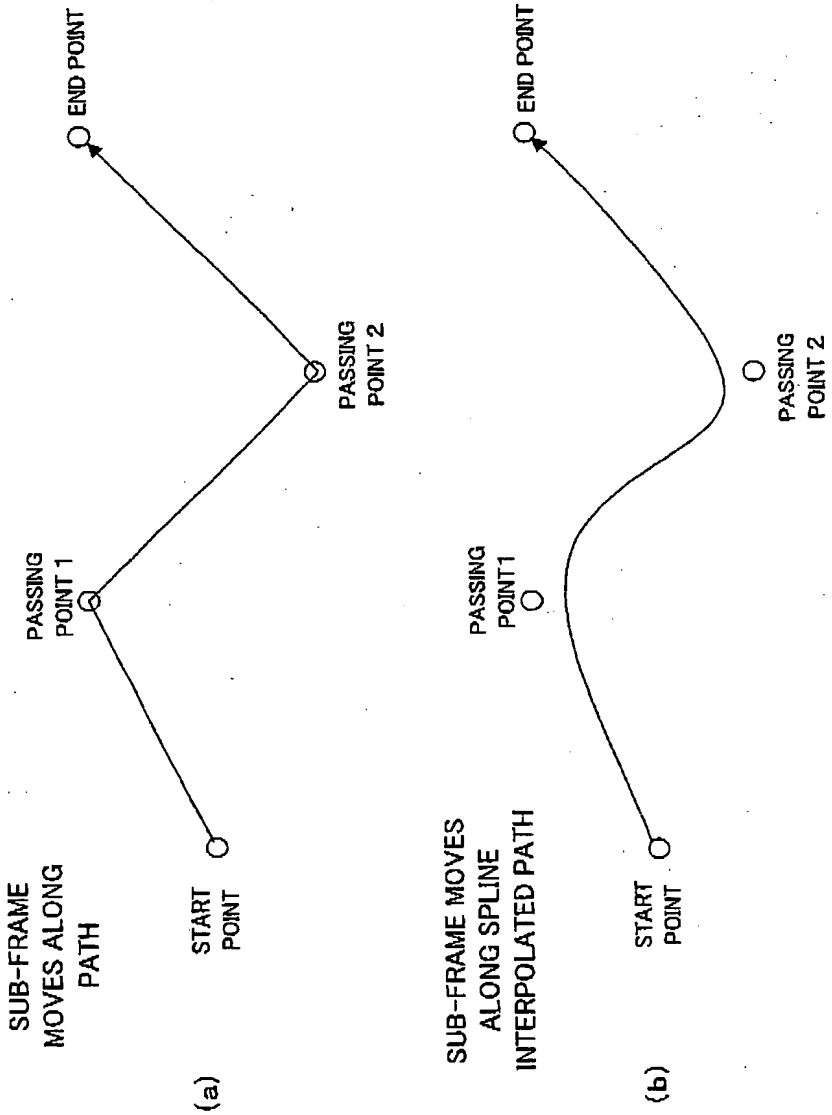

SUB-FRAME MOVES ALONG PATH
START POINT
PASSING POINT 1
PASSING POINT 2
END POINT
(a)
SUB-FRAME MOVES ALONG SPLINE INTERPOLATED PATH
START POINT
PASSING POINT1
PASSING POINT 2
END POINT
(b)

FIG. 39

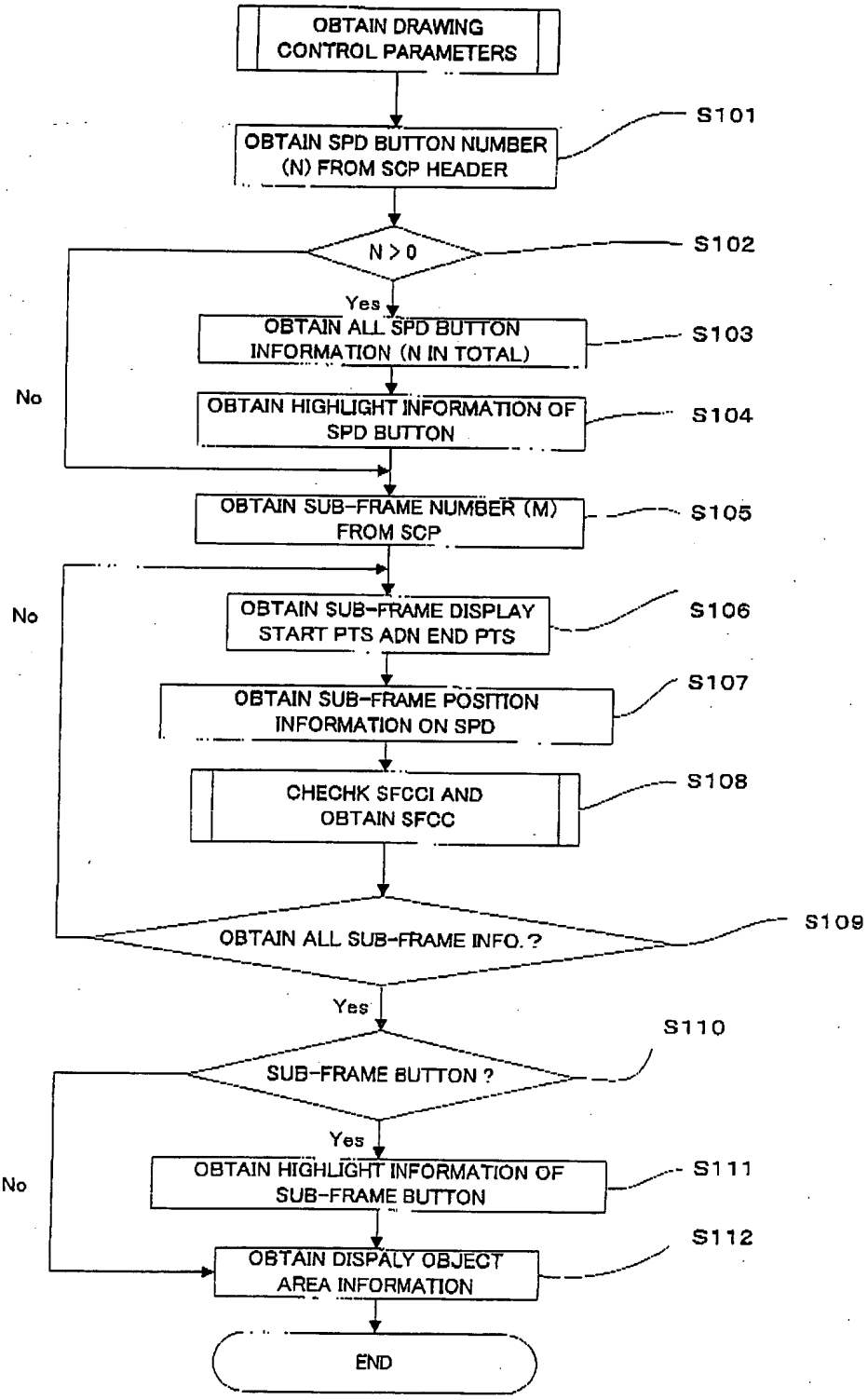

OBTAIN DRAWING CONTROL PARAMETERS
OBTAIN SPD BUTTON NUMBER (N) FROM SCP HEADER
S101
N > 0
S102
Yes
No
OBTAIN ALL SPD BUTTON INFORMATION (N IN TOTAL)
S103
OBTAIN HIGHLIGHT INFORMATION OF SPD BUTTON
S104
OBTAIN SUB-FRAME NUMBER (M) FROM SCP
S105
No
OBTAIN SUB-FRAME DISPLAY START PTS ADN END PTS
S106
OBTAIN SUB-FRAME POSITION INFORMATION ON SPD
S107
CHECHK SFCCI AND OBTAIN SFCC
S108
OBTAIN ALL SUB-FRAME INFO.?
S109
Yes
SUB-FRAME BUTTON ?
S110
Yes
No
OBTAIN HIGHLIGHT INFORMATION OF SUB-FRAME BUTTON
S111
OBTAIN DISPALY OBJECT AREA INFORMATION
S112
END

FIG. 40

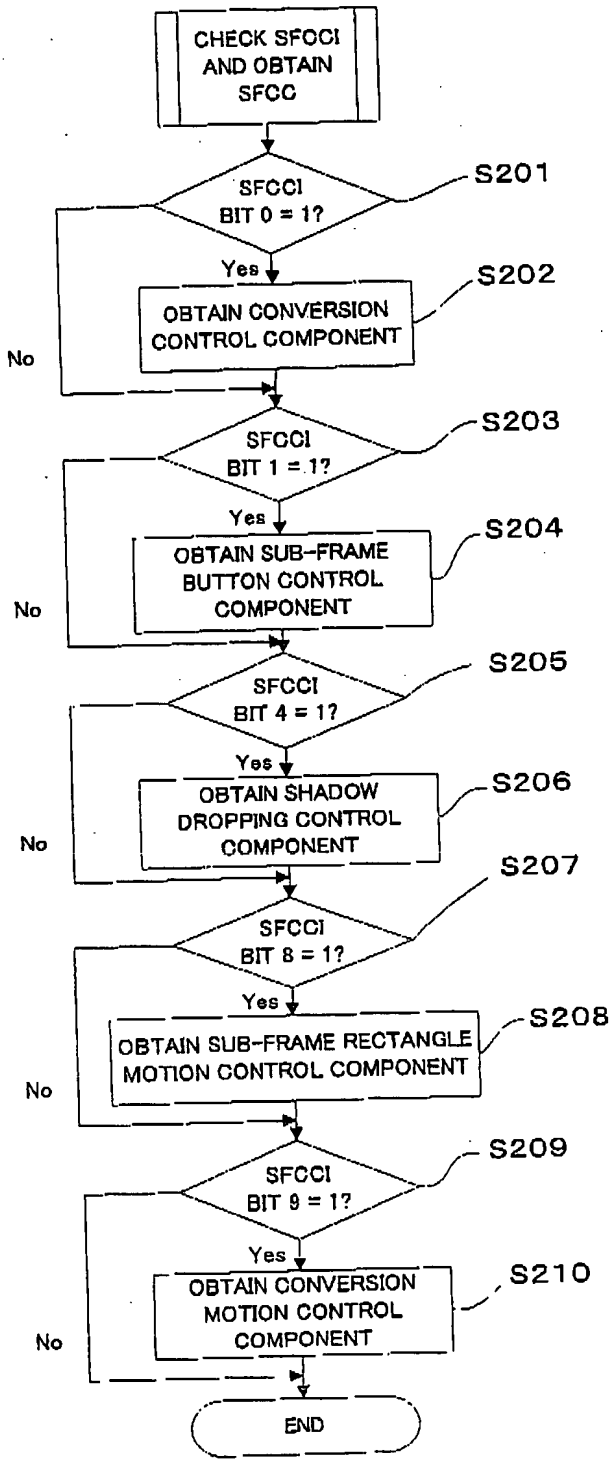

CHECK SFCCI AND OBTAIN SFCC
SFCCI BIT 0 = 1?
S201
Yes
No
OBTAIN CONVERSION CONTROL COMPONENT
S202
SFCCI BIT 1 = 1?
S203
Yes
No
OBTAIN SUB-FRAME BUTTON CONTROL COMPONENT
S204
SFCCI BIT 4 = 1?
S205
Yes
No
OBTAIN SHADOW DROPPING CONTROL COMPONENT
S206
SFCCI BIT 8 = 1?
S207
Yes
No
OBTAIN SUB-FRAME RECTANGLE MOTION CONTROL COMPONENT
S208
SFCCI BIT 9 = 1?
S209
Yes
No
OBTAIN CONVERSION MOTION CONTROL COMPONENT
S210
END

FIG. 41

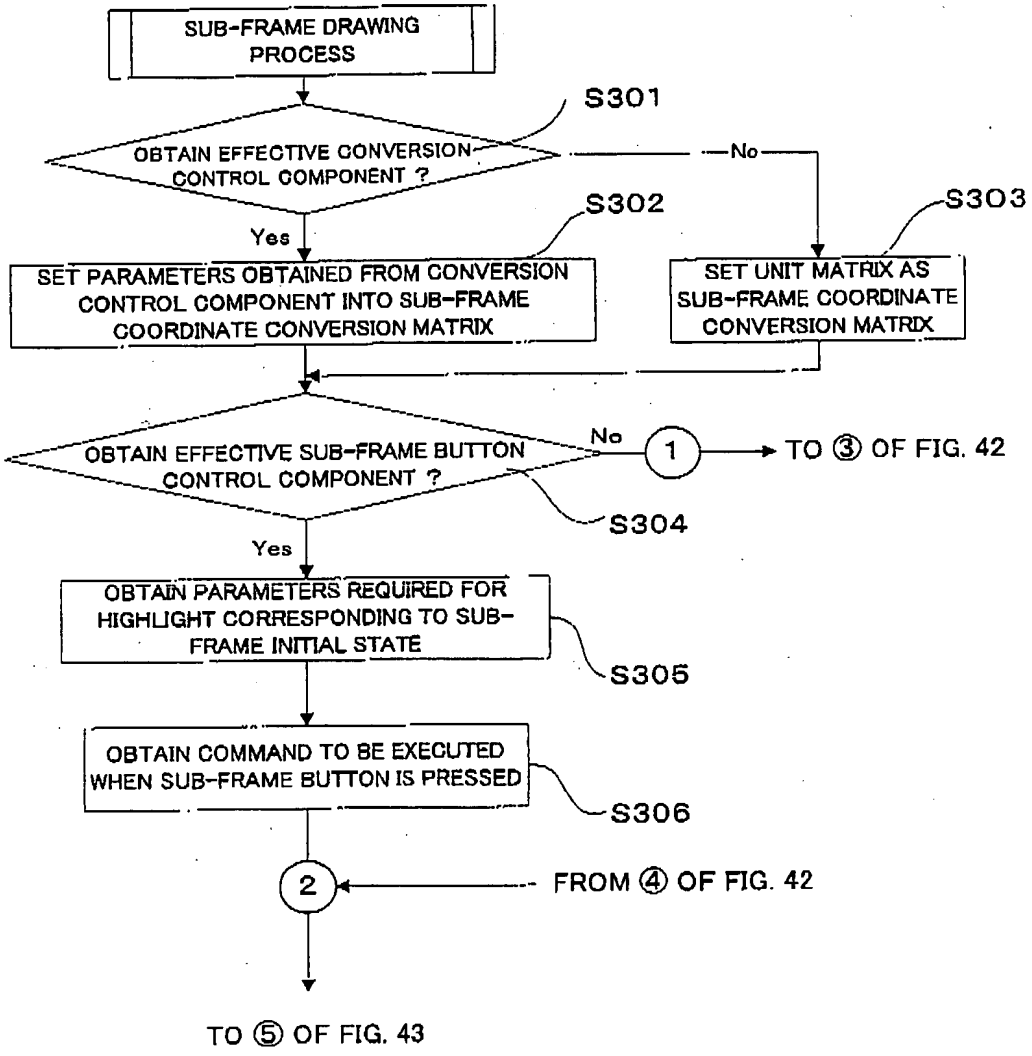
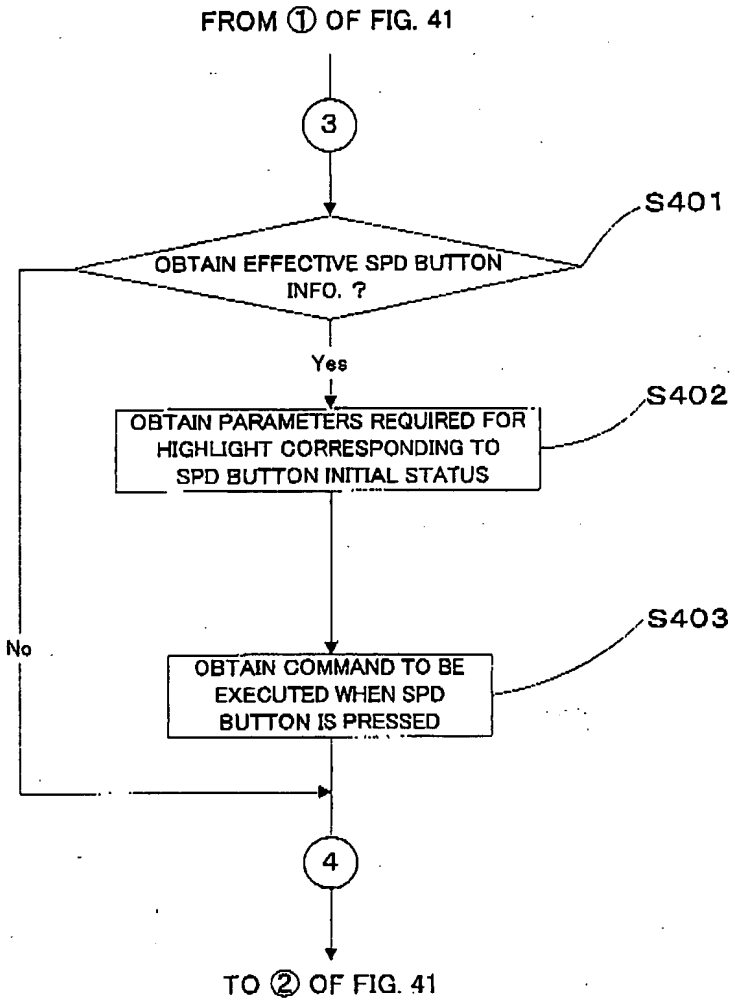

SUB-FRAME DRAWING PROCESS
S301
OBTAIN EFFECTIVE CONVERSION CONTROL COMPONENT ?
No
Yes
S302
SET PARAMETERS OBTAINED FROM CONVERSION CONTROL COMPONENT INTO SUB-FRAME COORDINATE CONVERSION MATRIX
S303
SET UNIT MATRIX AS SUB-FRAME COORDINATE CONVERSION MATRIX
OBTAIN EFFECTIVE SUB-FRAME BUTTON CONTROL COMPONENT ?
No
1
TO ③ OF FIG. 42
S304
Yes
OBTAIN PARAMETERS REQUIRED FOR HIGHLIGHT CORRESPONDING TO SUB-FRAME INITIAL STATE
S305
OBTAIN COMMAND TO BE EXECUTED WHEN SUB-FRAME BUTTON IS PRESSED
S306
2
FROM ④ OF FIG. 42
TO ⑤ OF FIG. 43

FIG. 42


FROM ① OF FIG. 41
3
S401
OBTAIN EFFECTIVE SPD BUTTON INFO. ?
Yes
No
S402
OBTAIN PARAMETERS REQUIRED FOR HIGHLIGHT CORRESPONDING TO SPD BUTTON INITIAL STATUS
S403
OBTAIN COMMAND TO BE EXECUTED WHEN SPD BUTTON IS PRESSED
4
TO ② OF FIG. 41

10/529867

FIG. 43

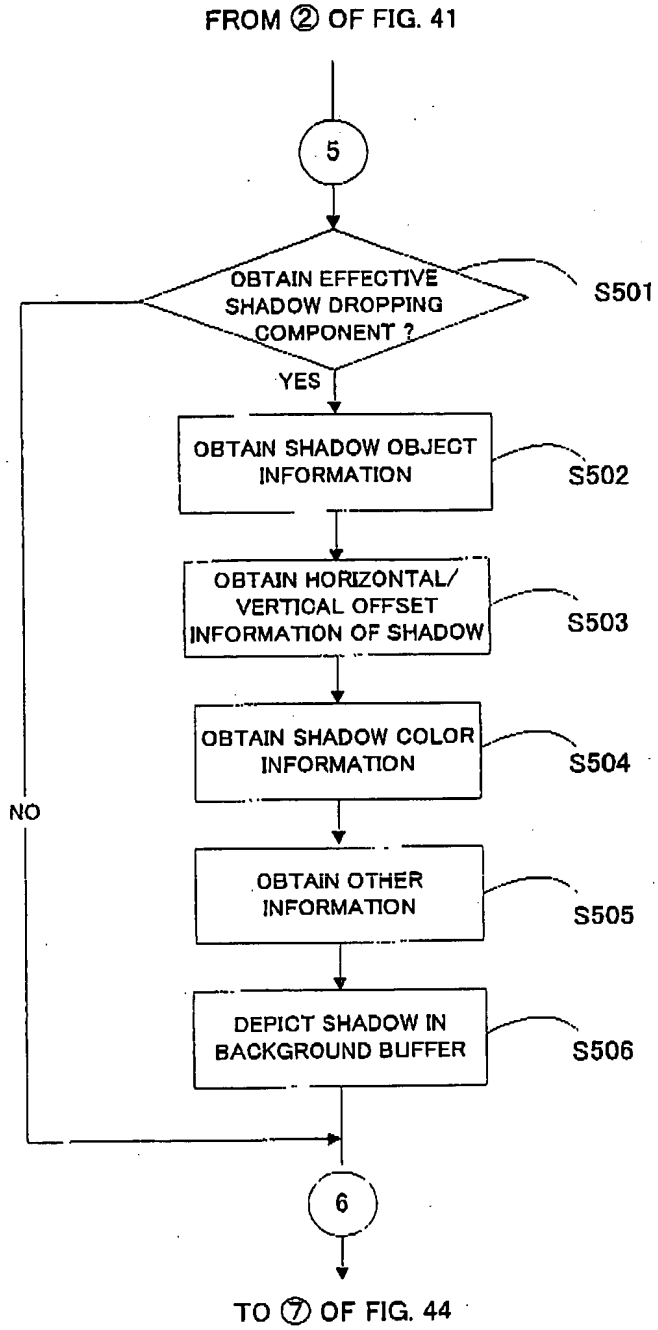


FIG. 44

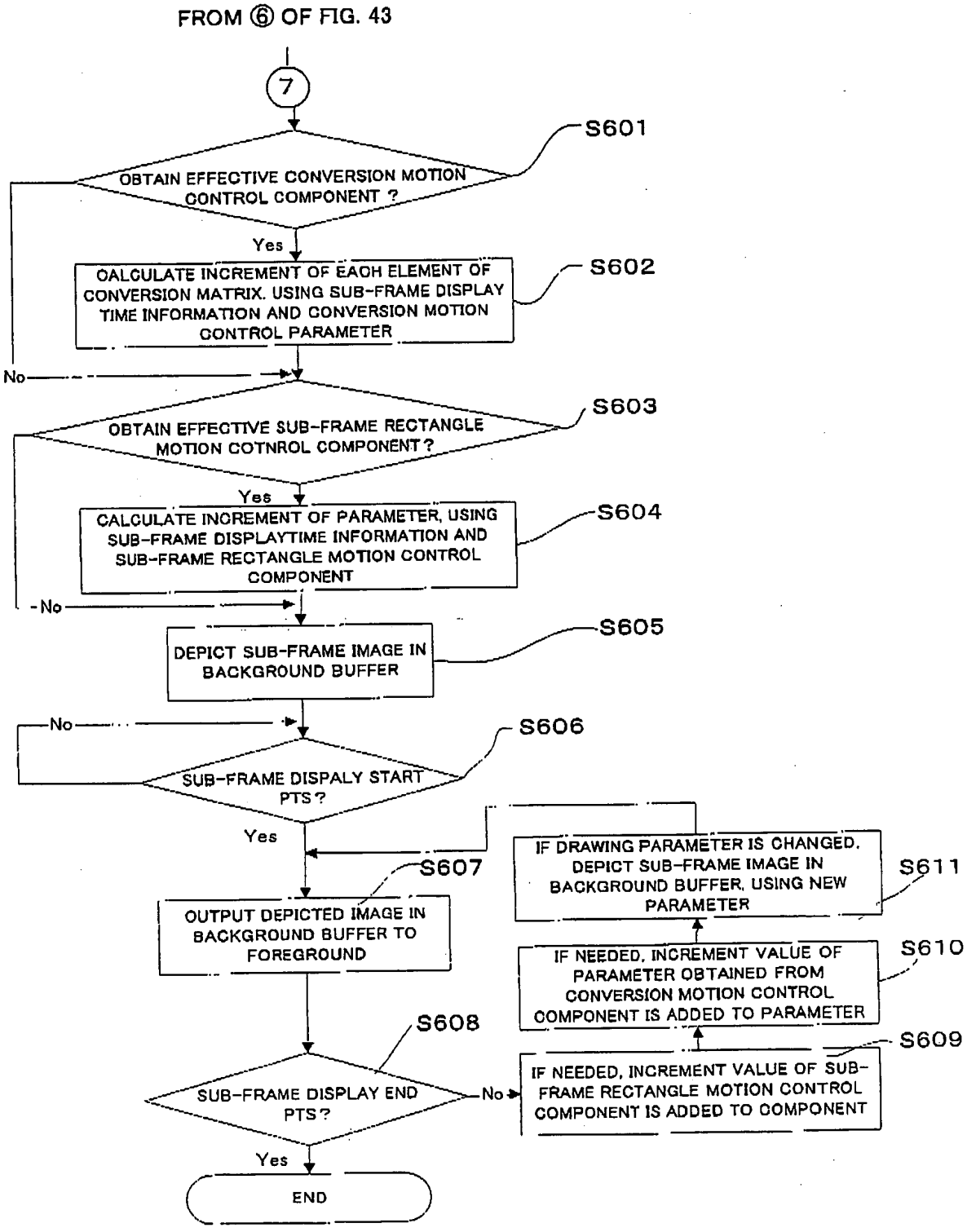

FROM ⑥ OF FIG. 43
7
S601
OBTAIN EFFECTIVE CONVERSION MOTION CONTROL COMPONENT ?
Yes
S602
OALCULATE INCREMENT OF EAOH ELEMENT OF CONVERSION MATRIX. USING SUB-FRAME DISPLAY TIME INFORMATION AND CONVERSION MOTION CONTROL PARAMETER
No
S603
OBTAIN EFFECTIVE SUB-FRAME RECTANGLE MOTION COTNROL COMPONENT?
Yes
S604
CALCULATE INCREMENT OF PARAMETER, USING SUB-FRAME DISPLAYTIME INFORMATION AND SUB-FRAME RECTANGLE MOTION CONTROL COMPONENT
No
S605
DEPICT SUB-FRAME IMAGE IN BACKGROUND BUFFER
No
S606
SUB-FRAME DISPALY START PTS?
Yes
S607
OUTPUT DEPICTED IMAGE IN BACKGROUND BUFFER TO FOREGROUND
S608
SUB-FRAME DISPLAY END PTS?
No
Yes
END
S609
IF NEEDED, INCREMENT VALUE OF SUB-FRAME RECTANGLE MOTION CONTROL COMPONENT IS ADDED TO COMPONENT
S610
IF NEEDED, INCREMENT VALUE OF PARAMETER OBTAINED FROM CONVERSION MOTION CONTROL COMPONENT IS ADDED TO PARAMETER
S611
IF DRAWING PARAMETER IS CHANGED, DEPICT SUB-FRAME IMAGE IN BACKGROUND BUFFER, USING NEW PARAMETER

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FIG. 45

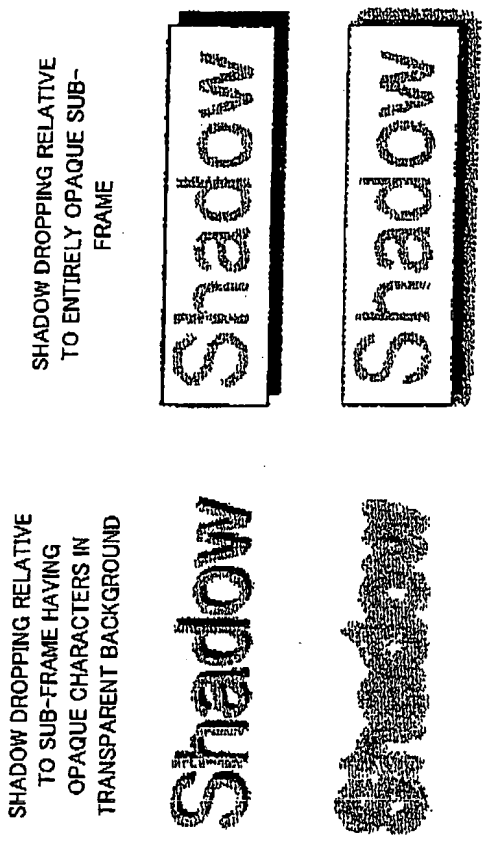


FIG. 46

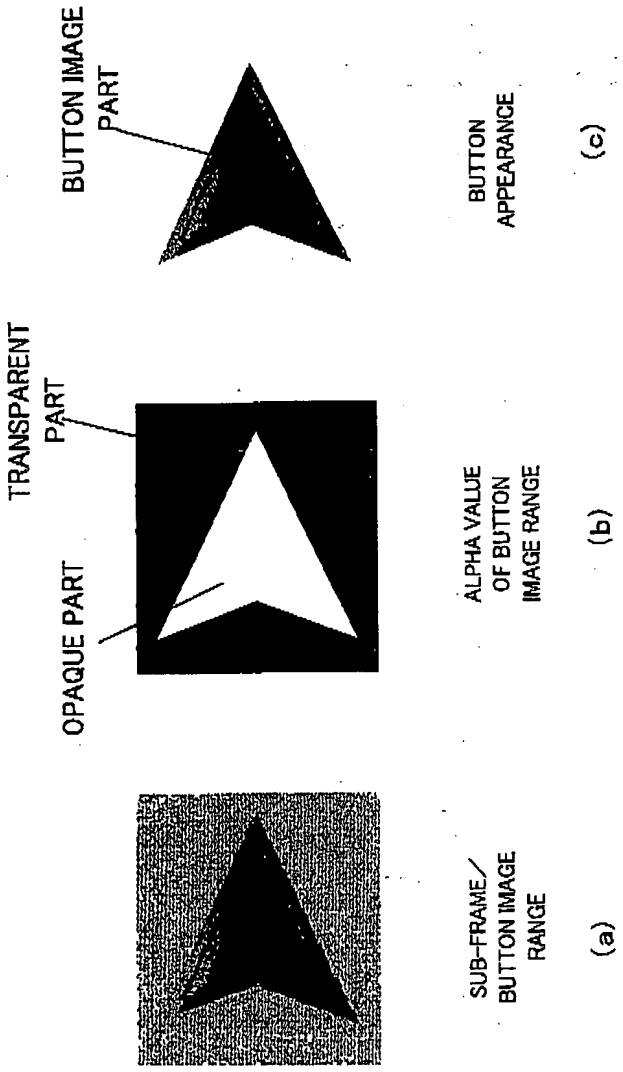
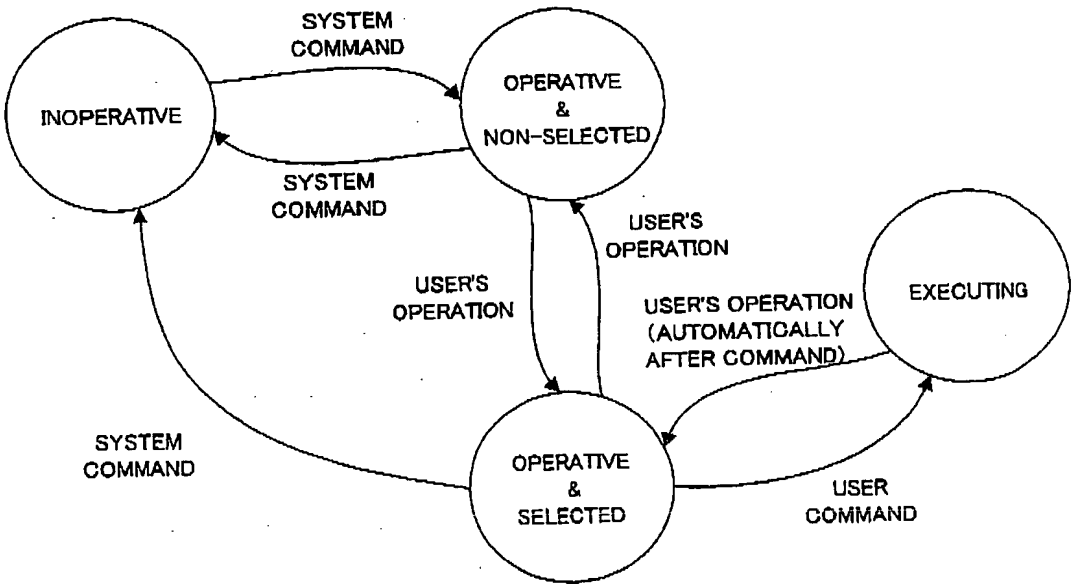

BUTTON IMAGE PART
TRANSPARENT PART
OPAQUE PART
SUB-FRAME/ BUTTON IMAGE RANGE
(a)
ALPHA VALUE OF BUTTON IMAGE RANGE
(b)
BUTTON APPEARANCE
(c)

FIG. 47


INOPERATIVE
SYSTEM COMMAND
OPERATIVE & NON-SELECTED
SYSTEM COMMAND
USER'S OPERATION
USER'S OPERATION
USER'S OPERATION (AUTOMATICALLY AFTER COMMAND)
EXECUTING
SYSTEM COMMAND
OPERATIVE & SELECTED
USER COMMAND

10/529867

FIG. 48

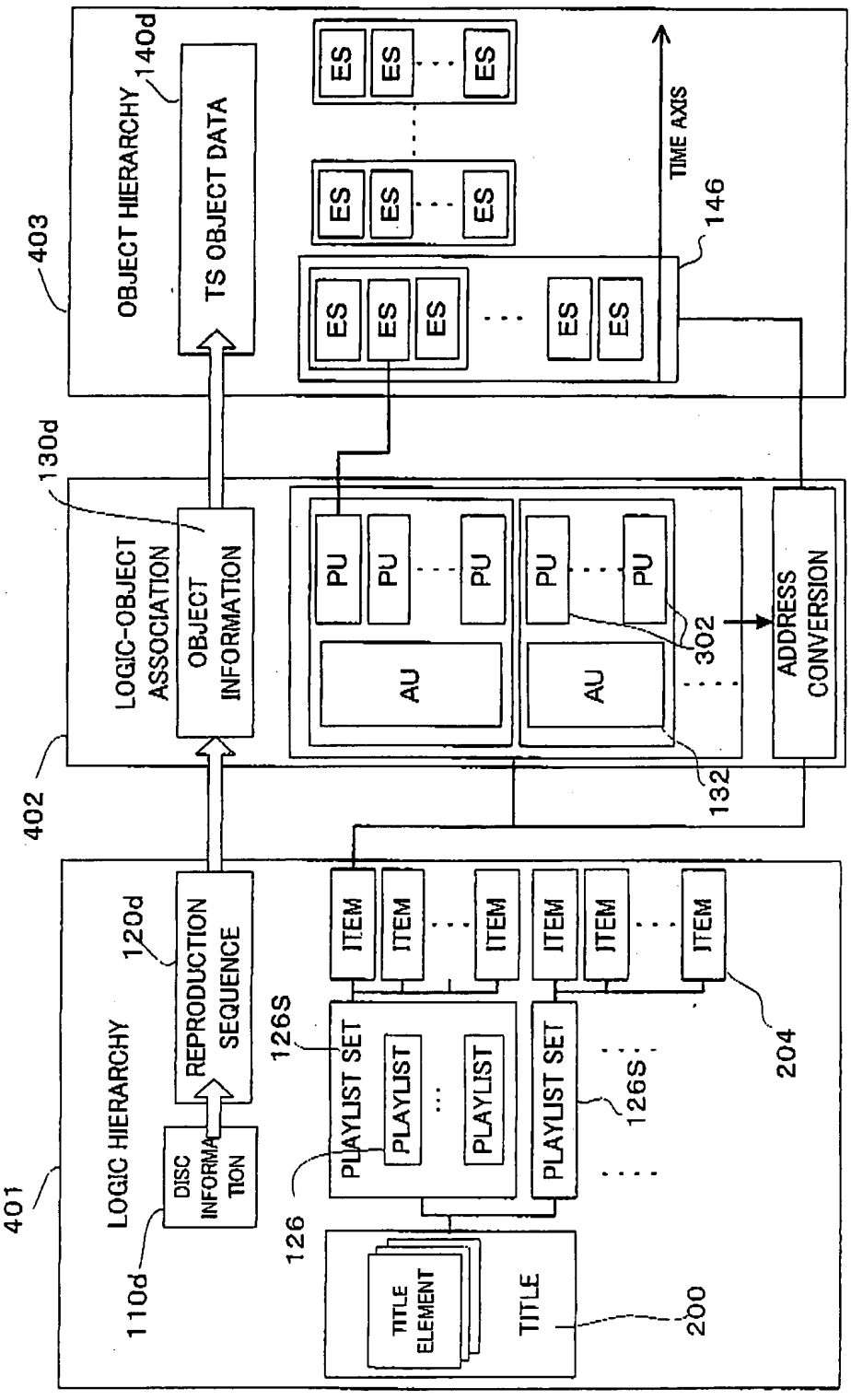


FIG. 49

131

AU Table

Field Name				Contents
AU Table General Information				the Number of AUs, Pointer to Each AU, etc.
AU Table	AU#1	PU#1	ES_Table Index#1	Index Number of ES_map table=1
			ES_Table Index#2	3
		PU#2	ES_Table Index#1	4
			ES_Table Index#2	5
	AU#2	PU#1	ES_Table Index#1	9
			ES_Table Index#2	10
		PU#2	ES_Table Index#1	12
			ES_Table Index#2	13
	AU#3	PU#1	ES_Table Index#1	14
			ES_Table Index#2	15
			ES_Table Index#3	16
			ES_Table Index#4	17
			ES_Table Index#5	18
Other Info.				Postion of ES_Map table, etc.

1321

3021

134

ES_Map Table

Field Name		Contents
ES_Map Table General Information		Index Number, etc.
ES_Map Table	Index #1	ES_PID Value=101
		Address Information
	Index #2	ES_PID=102
		Address Information
	Index #3	ES_PID=103
		Address Information
	Index #4	ES_PID=201
		Address Information
	Index #5	ES_PID=202
		Address Information
	Index #6	ES_PID=301
		Address Information
	Index #7	ES_PID=302
		Address Information
	Index #8	ES_PID=303
		Address Information
	Index #9	ES_PID=201
		Address Information
	Index #10	ES_PID=202
		Address Information
	Index #11	ES_PID=203
		Address Information
	Index #12	ES_PID=101
		Address Information
	Index #13	ES_PID=102
		Address Information
	Index #14	ES_PID=101
		Address Information
	Index #15	ES_PID=102
		Address Information
	Index #16	ES_PID=103
		Address Information
	Index #17	ES_PID=104
		Address Information
		Index Number of ES_map table of SP Data Stream operated =16
	Index #18	ES_PID=105
		Address Information
		Index Number of ES_map table of SP Data Stream operated =16
	Other Info.	Other Info.

134d

134e